THE IRON TRADE REVIEW

VOLUME XXVIII. CLEVELAND, O. JUNE 13, 1895. CHICAGO, ILL. NUMBER 24.

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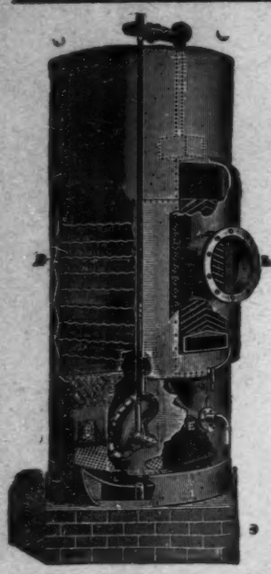

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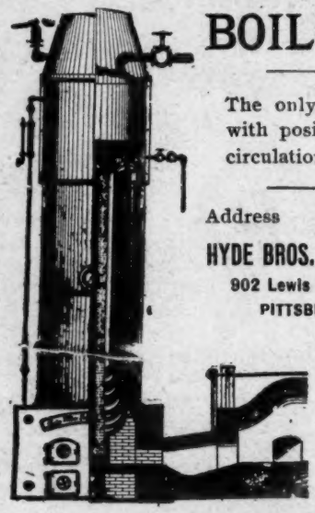

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THE IRON TRADE REVIEW

VOLUME XXVIII. CLEVELAND, O. JUNE 13, 1895. CHICAGO, ILL. NUMBER 24.

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The week has brought the regular quota of advances in prices and in wages, to the iron and steel industry. Mahoning valley furnacemen have granted their employes a second increase of 10 per cent, following the pace set in the Shenango valley a few weeks ago, and Eastern steel works have announced higher rates effective with July. In pig iron, under continued buying, Bessemer has risen to $11.80 in the valley and $12 is expected by sellers as the next stage in the advance, making the Pittsburg price $12.65. The most important development is the renewed effort to make effective what has been discussed at intervals for several years, in connection with the leading pig iron producers of the South—the establishment of a selling agency and the allotment of output, with an agreed basis of prices for the different grades. It is reported that $7.50 for gray forge at Alabama furnace is the figure talked of. The Tennessee Coal, Iron & Railroad Co., and the Sloss Iron & Steel Co. are the chief figures in the arrangement and it is believed their directors have sanctioned a year's arrangement. The steady advance in Southern iron, amounting now to $1, has been supported by the well sold condition of the leading furnaces and this condition opens the way to still higher prices, so that the difficulties such a move would have encountered at any time in the past two years are largely removed. With the proposed advance in Southean iron there would be no difficulty in holding current prices on Northern foundry and forge irons, and giving a margin beside for still higher prices, especially if Southern roads should put their rates up correspondingly. The latest from Connellsville coke producers is that the old obstacle to a combination is still unremoved, and the talk of a $1.50 rate, and even higher, after July 1 has not yet materialized in contracts. It is known that a supply has been taken in one instance for the last four months of the year at $1.35, and a lower figure has been secured on several other contracts running through the second half of the year. Railroad buying seems to hinge just now—at least in the case of most Western lines—on what shall prove to be the fact about grain crops. Reports from the corn belt are more encouraging, and the advance in wheat has been checked. These conditions, together with the general car shortage, which will be more marked when shipments from Central Western mines are fully resumed, point to increased railroad orders in the near future. The decision to put up the price of rails to $24 Eastern mill on July 1, is only in line with the increased cost of raw materials and of labor. In steel billets, Pittsburg sales of the week have been at $18.50 and $18.75, deliveries in the third quarter of the year, and in view of the strong feeling in Bessemer iron, steel mills count on maintaining this basis. The meeting of the Merchant Bar Iron Association at Indianapolis, June 11 and 12 resulted in another advance of $1 a ton on bar iron, making $4 since the association was formed.

THE CLEVELAND DISTRICT.

In the wake of the heavy sales of Bessemer ores noted last week have come a few scattering sales, including 10,000 to 20,000-ton lots of Gogebic Bessemers and the most desirable Mesabi ores. Not only have old range Bessemers been well sold up, but the two or three foremost Mesabi mines have well-nigh disposed of their possible output for this year. An event of interest for its bearing on the Eastern market is the landing at Philadelphia of the first cargo of ore from the Spanish-American Iron Co.'s mines in Cuba. It consisted of 4,100 tons. Something like 50,000 tons of this ore is said to have been sold to Eastern Pennsylvania furnaces. The sales agency is in Cleveland hands. Lake freights are not quite so strong this week. While the Duluth and Ashland rate is still 85 cents, there has been no great activity in charters. Shippers are doing little from Marquette, and while the rate is 75 cents, are predicting the early establishment of 70 cents, owing to the ability of several mines to send ore handily to Escanaba, from which the rate has fallen to 50 cents.

Pig Iron. From $12, Pittsburg, a week ago, Bessemer iron has at last touched that figure at valley furnace, two transactions involving 10,000 tons being reported at $12.65, Pittsburg, in the last two days. Another sale of 6,000 tons, made earlier in the week, was at $11.80, valley furnace. The feeling is firm, and sellers are confident that in view of the metal that is sold ahead and the comparatively small stocks of iron at furnaces, there will be no weakening. With fair buying by the railroads an advance is rather looked for. Up to the first of the present week foundry iron was steadily called for, but demand is now somewhat eased up, though it is known that buyers whose requirements are of good proportions will come into the market in the near future. Prices have been maintained for the most part at $10.50 for No. 2 and $11.50 for No. 1, but in view of the advance in Bessemer iron there are some valley producers who expect to ask a higher price for No. 1 foundry. The expansion of puddling operations has made a good demand for gray forge. A sale at $10.10 in the valley is reported. The refusal of W. J. Rainey to enter into any arrangement about coke prices may not prevent a combination by other producers, but the fact that contracts have been made at $1.35, at $1.25, and even a somewhat lower figure, will make it difficult to establish a $1.50 rate even among operators willing to combine.

Finished Material. Sellers are at last becoming somewhat accustomed to the complete turning of the tables in the past six weeks and are recovering a long-lost ability to ask an emergency price. Buyers who answer that they can't pay any such figure as the one quoted seldom fail to send their order when told that the price is subject to immediate acceptance. On plates, the jump has been $2 at a time for several weeks and mills able to take orders for delivery in July are getting from 1.35c. to 1.45c. for tank steel, 1.50c. to 1.60c. for flange, and as high as 1.75c. for marine steel. Inquiries for several thousand tons came into the local market the past week. Beams and channels are active and the 1.30c. Pittsburg minimum is likely to be raised to 1.35c. in a

Continued on page 6.

THE CHICAGO OUTLOOK.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

The market grows stonger every week, and the conditions seem to indicate that it is an entirely natural gain. The amount of business done is increasing all the time, and the inquiry for material is also considerably larger. In raw material a large business was done last week, and demand promises to be large for some time to come. The sales of pig iron last week were considerably in excess of those of the week before, and the requirements of the consumers in this market seem to be by no means satisfied. Foundrymen, as a rule, are using very much more iron than they had expected, and as a consequence are buying additional pig metal in large quantities. Prices have been advanced again, both on Northern and Southern iron. Bar iron has been in good demand, and some satisfactory sales have been made. Rails and track supplies have kept up to the demand of the past several weeks, and good sales have been made. Billets have sold only in small lots, because the local mills have not been in position to supply all buyers. Other classes of material have sold well up to the record established in recent weeks, and in some cases have exceeded this.

PIG IRON.—Dealers in pig iron, both Northern and Southern, have been more inclined to buoyancy than for several weeks past. Sales of local iron have been large and the inquiry has apparently suffered no diminution. While a good many of the larger buyers have filled their requirements in the past few weeks, there are still a large number who have not bought. Repeated advances apparently have no effect on the users of iron, as buying is heavier after each advance. The week has seen an advance of 50c. a ton on Northern irons, and sales have been much larger than in weeks. Contracts were of all sizes, from lots of 2,000 tons and over down to carloads, from all over this part of the country, and from all classes of buyers. There is a general belief among those best informed that prices will not be lower for some time. The opinion was expressed recently, by one in a position to know, that the market will be continually stronger, and that prices will be still higher in another month. Southern iron has not sold in such large quantities as Northern, principally because the furnaces are not in position to fill very large orders for immediate shipment, and are not over anxious to close contracts at present prices for long deliveries. Quotations have been advanced in the past week, and the furnaces require an additional advance over these prices for delivery beyond Sept. 1. The demand has increased in the past week, and buyers seem very willing to pay the advanced prices, if they can only get the iron. Lake Superior charcoal is more active and quite good sales were made in the past week. Quotations are now made as follows:

Lake Sup. Charcoal.....	$13 00@13 50	Southern No. 2 Soft.....	$10 75@11 00
Local Coke Fdy. No. 1...	11 25@11 50	South'n Silveries No. 1.	11 75@12 00
Local Coke Fdy. No. 2...	10 75@11 00	South'n Silveries No. 2.	11 25@11 50
Local Coke Fdy. No. 3...	10 50@10 75	Jackson Co. Silveries...	15 00@16 00
Local Scotch Fdy. No. 1.	11 25@11 50	Ohio Silveries No. 1.....	14 00@14 50
Local Scotch Fdy. No. 2.	10 75@11 00	Ohio Silveries No. 2.....	13 00@13 50
Local Scotch Fdy. No. 3	10 50@10 75	Ohio Strong Softeners...	13 00@13 50
South'n Coke No. 2.....	11 00@11 25	Alabama Car Wheel.....	16 50@17 00
South'n Coke No. 3	10 75@11 00	Malleable Bessemer.....	11 75@12 00
Southern No. 1 Soft.....	11 00@11 25	Coke Bessemer	12 00@12 50

BARS.—The market has been in very good condition and while sales have not been remarkably large, they have been very satisfactory, and buyers do not demur to paying the prices asked. Several good sized season contracts were placed by agricultural implement concerns, and several others are hanging fire, and will probably be closed in the present week. At the Merchant Bar Iron Association meeting now in session at Indianapolis, it is expected that prices will be advanced, and that something will be done looking to the establishment of a satisfactory list. Quotations are now made as follows: Common iron, 1.15c. to 1.25c.; guaranteed iron, 1.25c. to 1.35c.; steel bars from strictly billet stock, 1.30c. to 1.35c.

RAILS AND TRACK SUPPLIES.—Business in this class of material keeps up well, and good sales were made in the past week. The local mills are well filled with orders until Sept. 1, and the outlook is that they will be kept filled until the end of the year without any trouble. There is some talk of advancing prices on rails, and it is expected that such action will be taken before the first of next month. An advance of $2 is discussed. At present, prices are made as follows: Rails, $23 to $25; splice bars, 1.25c to 1.35c; track bolts, 2c to 2.05c; spikes, 1.65c to 1.70c.

BILLETS AND RODS.—Some few sales of billets have been made in the last week, at prices ranging from $20 to $21. Sheet bars are quoted at $22.50 to $23, and are in large demand. No sales of rods have been made by the local mills, which are full of orders, but prices would approximate $26.50 to $27. Deliveries can not be made on rods before September 1. It is expected that the Union works of the Illinois Steel Co. will be put in operation by Aug. 1, running on billets.

STRUCTURAL MATERIAL.—While no large orders have been closed, general business is increasing all the time, and the total tonnage closed every week is quite a good deal larger than the week previous. Prices are not advanced, but they are very firm. They are made as follows: Beams and channels, 1.50c to 1.60c; angles, 1.40c to 1.45c; plates, 1.45c to 1.50c; tees, 1.60c to 1.70c. Small lots from stock are quoted at from ¼c to ½c higher.

PLATES.—The amount of business done in the past week was considerably in excess of that of the week before, and the demand is increasing all the time both for store business and mill shipments. Quite a large business is coming forward in boiler plates, one order for 24 large boilers for a distillery at Terre Haute being in the market at present. Quotations are firmer every week, and are now as follows: Tank steel, 1.50c to 1.60c; flange steel, 1.75c to 1.90c; fire-box steel, 2.10c to 5c.; boiler tubes, 75 per cent discount.

MERCHANT STEEL.—Owing to the fact that agricultural implement makers are waiting to see what the crops will be before placing orders for their season's requirements, business in the past week has been rather quieter. Outside of this trade, a good business has been done both in mill and store orders. Prices are now made as follows: Open-hearth spring and tire steel, 1.70c to 1.75c; smooth-finished tire and machinery, 1.55c to 1.65c; Bessemer bars, 1.45c to 1.50c; tool steel, 5.50c to 7.50c; specials, 11c and upwards.

SHEETS.—Business has been large, but not of the volume it would have been if the mills could take all the orders that are offered. A large number of the mills are not anxious for business, and several of them refuse absolutely to make prices at present. Quotations are not at all uniform, each mill that is willing to quote at all making its own prices. Average quotations, however, are about as follows: No. 27 common iron, 2.55cc to 2.55c; sheet steel, 2.60c to 2.65c; galvanized sheets, 75 and 10 per cent discount.

OLD RAILS AND WHEELS.—Old iron rails have sold in small quantities at the quotations made last week, $13.75 to $14. Old steel rails are in fair demand at $8.50 to $9 for short, and $11 to $12 for long lengths. Old wheels

are quiet, and are quoted at $11 by holders, although buyers are hardly willing to pay so much.

SCRAP.—Business in the past week has been rather quiet, no large sales of old material being reported. Prices are made as follows: Railroad forge, $9.50; dealer's forge, $8.50 to $9; No. 1 mill, $7.25; heavy cast, $7.25; axles, $13.25 to $13.50; cast borings, $4.50; wrought turnings, $5.75; axle turnings, $6.50; mixed steel, $7.25; stove plates, $5 to $5.50; heavy melting steel, $8 to $9.

IN OTHER MARKETS.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Pittsburg. The heavy purchases of Bessemer pig iron reported last week, on the account of the leading interest here, have been followed by fair sales in the valleys and Pittsburg, some of the metal being for Eastern account. The bulk of the transactions of the week under review have been at $11.70 and $11.80 in the valley, while $12.65, Pittsburg, is said to have been touched in the past few days. The situation is stronger with every week, and should a good run of railroad buying follow, it would be hard to tell to what height prices would go. The advance in steel has more than kept pace with that of Bessemer iron and $18.50 has been the basis of billet transactions, deliveries in the third quarter of the year. The opinion is general that with Bessemer pig selling close to $12 in the valley for the second half of the year, billets are not likely to recede from the figure mentioned. Prompt billets, of which no supply can be had direct from mills have sold at $19 to $19.50. Bessemer iron has shown a greater gain in the week than foundry or forge. Rolling mills are fully employed, however, and the demand for forge iron is greater than the supply. In the past week a valley sale of 1,000 tons was made at $10 60 Pittsburg, and another at $10.75, or $10.10 at furnace. A sale of 2,000 tons of Southern forge iron was made at $10.50, but it is now reported that $7.25 at Birmingham is the price at which Southern forge will be held. Muck bar has advanced $1 a ton the past week and sales are reported at $20 and $20.25. Finished material is practically without change, except that plate mills are accumulating orders, while some are turning away business because deliveries within five or six weeks are out of the question. Beams and channels are strong at 1.30c. @ 1.35c., at mill and the volume of small orders is constant. The output last month was the largest for the year and there is a possibility of a further advance of $1 a ton. The new discounts adopted by the wrought iron pipe and boiler tube manufacturers on June 4 amount to a 10 per cent advance in their product, from the list adopted in January. Bars are firm at 1.05c mill, for iron, and 1.10c minimum for steel, with prospects of a further advance. Galvanized sheets have advanced and are likely to go higher, selling at 75 and 10 to 75 and 5 per cent discount. Sheet bars are hard to get for June delivery, and $22.50 to $23 is being paid.

Cincinnati. The pig iron market has not been lacking in interest during the week just closing. The speculative spirit which has made itself felt in other lines, and which was slow in appearing in iron, is now quite in evidence. Without any noteworthy change in the actual conditions, the temper of buyers and sellers has changed very decidedly. The question which all are asking is, whether there is sufficient increase in actual consumption of Bessemer, forge and foundry irons to take the current product, together with the increase of output that will naturally follow the advance in prices, and still maintain values. On this all important matter of consumption, all accounts agree that in Bessemer pig and in gray forge it has distinctly increased. In foundry irons there is no noticeable increase, but there is a disposition of consumers to carry a little more iron in their yards than they have hitherto been doing, and when this is multiplied by several thousand foundries it makes an appreciable difference in the demand. The actual advances to be recorded are about 50 cents per ton in Bessemer since last report, it having been sold at $11.75 at valley furnaces, while gray forge has sold at $10.10. In Southern irons, the advance of 25 cents which was announced Decoration Day, is maintained firmly, and gray forge and No. 3 foundry have been advanced 25 cents further, making gray forge now $7 at Birmingham, or $1 per ton higher than it was in March. In the past two days a further advance of 25 cents a ton is announced on all grades of Southern iron. In foundry irons there has been no very active business during the past week, but taking the aggregate of Bessemer, malleable, gray forge, car wheel and foundry orders, the business has been of quite large proportions.

St. Louis. The past two weeks has shown that the iron market can go up just as fast as it can decline when regulated by supply and demand. In a number of cases buyers have found that before they had made up their minds to place their orders, quotations were withdrawn, and they were compelled to pay the advance. Prices of Southern iron have advanced more than $1 a ton since April 15 and the market is gaining strength daily. Reports are coming in of an improvement in all branches of the foundry trade which began with the car works some three months ago. The future seems brighter for the iron trade than it has for a long period.

Buffalo. The week has shown an active market, with increasing sales in both general foundry coke iron and charcoal iron. Some slight advances have been made by individual furnaces and in special grades which happen to be more heavily sold than others. A feature in the trade which has long been lacking is the re-entering the market of buyers who were supposed to have purchased their full requirements; but, gaining confidence in the future, are placing additional orders for the same kind. The demand may be called good and the tone of the market strong.

Tin Plate Association's Annual Meeting.

The Tin Plate Manufacturers' Association at its annual meeting at Pittsburg, June 5, elected the following officers and managers for the coming year: President, W. T. Graham, Bridgeport, O., succeeding W. C. Cronemeyer; vice president, Warner Arms, Niles, O., succeeding T. K. Niedringhaus; secretary and treasurer, John Jarrett, Pittsburg; managers, Alfred Marshall, Philadelphia; C. R. Britton, Cleveland; T. M. Somers, Brooklyn; W. B. Leeds, Elwood, Ind.; William Banfield, Irondale, O.; T. K. Niedringhaus, St. Louis; W. C. Cronemeyer, McKeesport, George Greer, New Castle, and A. W. Brown, Ellwood, Pa. Messrs. Graham, Arms, Leeds, Brown, Greer, C. M. Stewart, of Gas City, Ind., and C. W. Strawbridge, of Pittsburg, were appointed a wage committee. Twenty-seven companies making black plates were represented at the meeting. It is expected that a conference with the Amalgamated Association wage committee will be held at an early date, and that this will precede the conference between the Amalgamated committee and the bar iron manufacturers.

MR. L. M. MOYES, the patentee and manufacturer of the Combine safety water tube boiler, has entered suit, through his attorneys, Messrs. Biddle & Ward, of Philadelphia, against the Stirling Boiler Co., of Barberton, O., alleging infringement.

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JUNE 13, 1895.

HISTORY is repeating itself in the Connellsville coke market. The refusal of one operator to enter any arrangement to hold prices may result in the new rate falling short of the other operators' aim; but at the same time it is true that the market will not necessarily be controlled by the price named by the one independent producer. Other considerations than that of price seem to have weight in determining the destination of coke orders.

THE selling arrangement which it is reported the two leading Southern pig iron interests have agreed to make would certainly be strengthened were the Woodward Iron Co. included, and some arrangement made to control the competition of Virginia furnaces in Eastern Pennsylvania and New England. Perhaps when the plan is fully elaborated before the public it will be found to be more thoroughgoing and more effective in holding prices than would now appear. A selling agency would save a large sum annually, and an agreement on prices would no doubt be conducive to dividends. But there are many idle furnaces in the South, whose opportunity to come into the producing column would be just such an advance as is being discussed.

IN connection with the various efforts made in the past three months, and with almost uniform success, to lift iron and steel manufactures out of the slough, it is proper now to point to the wise initiative taken by the producers of Lake Superior Bessemer ores. When it was proposed last winter to take some concerted action to prevent a repetition of the disasters of 1893 and 1894 in Lake Superior iron mining, there were those pessimistic enough to assert that no relief could be secured in the way proposed. They seemed to see nothing ahead but a ruinous competition that would soon tire out the smaller producers, meantime depleting the resources of the strong companies and keeping up the pace of demoralization that had involved blast furnace and other interests all along the line. Others had the faith and the courage to believe that, no matter what the popular judgment might be about a plan that involved an agreement to maintain a price, such prejudice could not possibly harm the iron mining companies as much as the foolish policy of producing ore at a loss. It is easy to see that had the management of the agreement been in the hands of less conservative, less judicious or less courageous men, mistakes might have been made from which the entire iron trade would have suffered. And after preliminaries had been disposed of, and the possibility of some sort of agreement was demonstrated, the same wisdom that prompted the movement was present to restrain any disposition to use the power to advance prices in any way that would not commend itself to the judgment of fair-minded buyers. Every step was taken in this spirit and when the test came, there was no long struggle between buyer and seller, the former being convinced that his share in the benefit of the arrangement would not be long coming. It was not long before the coke interest made a similar move, and its justification was found likewise in the fact that any time is a fit time to stop selling at a loss. The demurrer that came up here and there, that conditions were not ripe for such a step, had this for its answer. An advance in wages came at the same time and that helped to popularize the move. From that time on higher prices and higher wages became a matter of almost weekly record. There were skeptics—many who refused to believe that the new prices were anything more than an asking figure that would soon be battered down. But no decline came; instead there was a steady ascent, with no indication anywhere to-day that the movement is to be interrupted. It has been attended by no speculative feverishness, though in the last week or two a caution has been sounded here and there; and there is good ground for the belief that the trade will hold its head and not imperil anything that has been gained. Looking over the ground that has been traversed, and canvassing all the movements and conferences that have been making the history of the past ten weeks, there is no doubt that the conservatism that has marked the advances in all lines is attributable largely to the wisdom and foresight of the primary producers.

THE CLEVELAND OUTLOOK.—Continued from Page 3.

short time. In the past week a 500-ton sale of shapes was made to a bridge company and another bridge order calls for a good tonnage. Sheet mills are not quoting on far forward deliveries, and can guarantee early shipment on but limited amounts. Advances on galvanized have been 20 to 25 per cent, with the demand well maintained. Some steel rail orders are in prospect from Ohio roads, and one electric road contract for 1,200 tons of T rails is soon to be let. The Indianapolis advance on bar iron makes the price 1.10c. at valley mill in car lots, with freight to outside points scheduled in a complete list of delivery prices. Demand is well maintained. Higher prices for steel are emphasized in recent transactions. In the past week a Pittsburg house sold 16,000 tons of billets in Cleveland, prices ranging above $19, and for a portion of the sale reaching $19.50. A 1,000 ton rod sale is reported at $25 Cleveland. Negotiations have been practically concluded in the past two days for the purchase of the Baackes Wire Nail Co.'s plant in Cleveland by the Consolidated Steel and Wire Co. The plant has been operated by Receiver Riddle since July, 1893.

Sale of the Baackes Wire Nail Works.

It is understood that negotiations have been under way for some time for the acquisition of the Baackes Wire Nail Co.'s works in Cleveland, by the Consolidated Steel & Wire Co. President Edenborn, of the latter company, has been in Cleveland this week and before his return to Chicago on Wednesday, signed the papers. The consideration is said to be somewhat over $400,000. The plant has been operated since the assignment in 1893 by Assignee John Q. Riddle, and the sale will require to be confirmed by the court before it becomes affective. It is stated that the plant will be, as heretofore, under the management of M. Baackes, vice president of the old company. It has an annual capacity of 36,000 gross tons of rods, 36,000 gross tons of wire and 600,000 kegs of nails.

LAKE SUPERIOR IRON MINES.

The stockpile of the Escanaba River Land & Iron Co., containing about 7,000 tons of ore, has been bought by the Cleveland Cliffs Co.

At the Millie mine 35 men are now employed, and the force will be increased to 50.

At the Chapin mine 65,000 tons of ore was hoisted in May. The force is now 850 men.

Shipments from Menominee range mines to Escanaba are at the rate of over 10,000 tons a day.

Employes of the Penn Iron Mining Co. at Norway demanded an advance in wages last week. General Manager Kelly is in correspondence with the Philadelphia office on the matter, the men returning to work meantime. The recent advance at the Aragon mine, at Norway, is said to have simply brought wages there up to what the Penn Co. has been paying.

The jury in the case of McKinley and others against the Lake Superior Consolidated Iron Mines and John D. Rockefeller, on trial at Duluth, reported on Friday, June 7, that after being out 48 hours it had become satisfied that agreement was impossible and the jury thereupon was discharged. It is said that there were 11 for the plaintiffs and one for the defendants and that the damages favored by the eleven ranged from $200,000 to $588,000. Widely diverse estimates were given by experts as to the value of the McKinley mine, whose acquisition by the Consolidated laid the foundation for the suit. E. Florada, of the Oliver mine, estimated the ore on the fee lands at 1,000,000 tons, of which 40 per cent he thought would be marketable. He put the value of fee and leased lands at $200,000. Richard A. Parker, of Marquette, who had examined the property, was a witness for the defense. He put the merchantable ore at not to exceed 1,000,000 tons; the balance was low grade and unsalable. He put the value of an undivided four-fifths fee-land interest in the McKinley property, under a 30 cent royalty, 50-year lease at $115,000 and regarded the Pettit & Robinson lease-hold of no value.

The $1,250,000 damage suit of Lon Merritt against John D. Rockefeller is on trial this week at Duluth. The plaintiff in his testimony detailed his only conversation with John D. Rockefeller about the deal afterward made, by which the Merritt mines, the D. M. & N. road and Rockefeller's stocks in Gogebic mines and in the Spanish American Iron Co. were merged in the Consolidated. Rockefeller said, according to the witness, that Mr. Gates would represent him in the negotiations. Merritt said that Gates represented that the ore companies in which Rockefeller had stock were sound and dividend-paying.

Shipments last week from Ashland were 102,423 tons, making a season total of 483,942 tons.

The annual meeting at Duluth, of the Minnesota Iron Co. and of the Duluth & Iron Range railroad on Monday and Tuesday of this week was made the occasion of a notable excursion of capitalists. Chicago was the starting point, about 150 gentlemen, including Minnesota Iron Co. directors and stockholders, a large party of Chicago men, a number of Pittsburg steel masters, Cleveland ore sales agents, valley furnace men and others, taking the Northwest at Chicago Friday noon. Ex-Gov. Flower and other New Yorkers were also aboard. Among those invited to make the trip, nearly all of whom accepted, were H. C. Frick, Henry A. Laughlin, J. G. A. Leishman, H. W. Oliver, Geo. T. Oliver, of Pittsburg; James Pickands, H. H. Brown, E. W. Oglebay, Samuel Mather, John Tod, W. G. Mather, S. P. Ely, Daniel P. Eels, Cleveland; Tod Ford and Henry Wick, Youngstown; J. C. Morse, J. W. Gates, Marshall Field, P. D. Armour, D. H. Bacon, L. J. Gage, R. T. Lincoln, G. M. Pullman, H. H. Porter, Chicago. Duluth was reached Sunday evening. The election of directors and officers of the Duluth & Iron Range railroad at Duluth, Monday, resulted in the choice of the old board, with H. H. Porter, Chicago, chairman of the executive board and J. L. Greatsinger, Duluth, president. The Minnesota Iron Co. elected officers as follows: Chairman of the executive board, H. H. Porter, Chicago; president, D. H. Bacon, Tower, Minn.; vice president, Henry Seibert, Brooklyn; treasurer and assistant secretary, A. J. Patterson, New York; secretaty and assistant treasurer, C. P. Coffin, Chicago; directors, H. H. Porter, Marshall Field, R. H. Lee, J. C. Morse, of Chicago; Henry Seibert, Brooklyn; D. O. Mills, H. M. Flagler, H. R. Bishop, R. P. Flower, New York; P. H. Kelly, St. Paul; Benjamin Brewster, Philadelphia, and D. H. Bacon, of Tower. The party took train for the Vermilion and Mesabi ranges, to inspect the company's iron mines. There has been more activity of late in Minnesota Iron Co. stock. It paid three per cent dividend in 1890, six per cent in 1891, six per cent in 1892 and three per cent in 1893. In the year 1894 there was earned something over four per cent on the $16,500,000 stock.

The hoist recently installed by the Edward P. Allis Co., of Milwaukee, at the Fayal mine on the Mesabi range consists of a pair of 18x42 direct-acting 1890 type engines with Corliss valve, but without trip motion, the cut off being regulated by hand by means of a straight link. The drum is 6′ diameter, 5′ face The brake is operated by hand wheel and worm gear. It is a band brake powerful enough to hold the engine when the throttle valve is wide open. The throttle valve is a double beat balanced valve. The whole construction is kept as simple as possible but is very strong and of substantial design.

A. S. M. E. Committee on Testing.

The meeting of the American Society of Mechanical Engineers at Detroit, Tuesday, June 25 to Friday, June 28, promises to be an interesting one, and judging from the preparations making by the local committee, the excursions for pleasure and inspection will be especially enjoyable. The committee on Uniform Standards in Test Specimens and Methods of Testing Materials, whose first report was presented at the New York meeting of the society in December, in a paper by W. J. Keep, will present further data to the society at the Detroit meeting. One of the papers, which will be by Mr. Keep, is under the title "Transverse Strength of Cast Iron." Mr. Keep will also have two other papers. It is not expected that the committee on testing standards will make an official report for six months or a year, on account of the time necessary to gather and arrange data. Columbia college has undertaken the tests of round bars and the subject of tensile tests.

Among the papers scheduled for the Detroit meeting are the following: "The Strength of Iron as Affected by Tensile Stress While Hot," by DeVolson Wood; "Effect of Length of Specimens on the Percentage of Ductility," by R. C. Carpenter; "Efficiency of Boilers," by F. W. Dean; "Force Required and Work Performed in Driving and Pulling out Wire Nails," by R. C. Carpenter; "Rustless Coatings for Iron and Steel," by Matthew P. Wood; "Down Draught Furnace for Steam Boilers," by Wm. H. Bryan; "Pipe Covering Tests," by Geo. M. Brill; "Expansion Bearings for Bridge Superstructures," by Geo. S. Morison.

An Advance In Steel Rail Prices.

We learn upon the best authority that an advance in the price of steel rails is under consideration by the steel rail manufacturers, and that it is extremely probable that an early advance will be decided upon. The price of standard sections has been $22 per ton since January last, and contracts already made will of course be filled at this price. The advance will probably be to $24, which was the price that ruled all through 1894. The increase in the cost of raw materials and labor is given as the reason for the proposed advance. The following table will show the advance in the prices of other iron and steel products which has taken place since the first of March last. It will be noticed that rails are the only product which has not advanced, although billets, to which they are closely allied, have in the meantime gone up over $3 per ton:

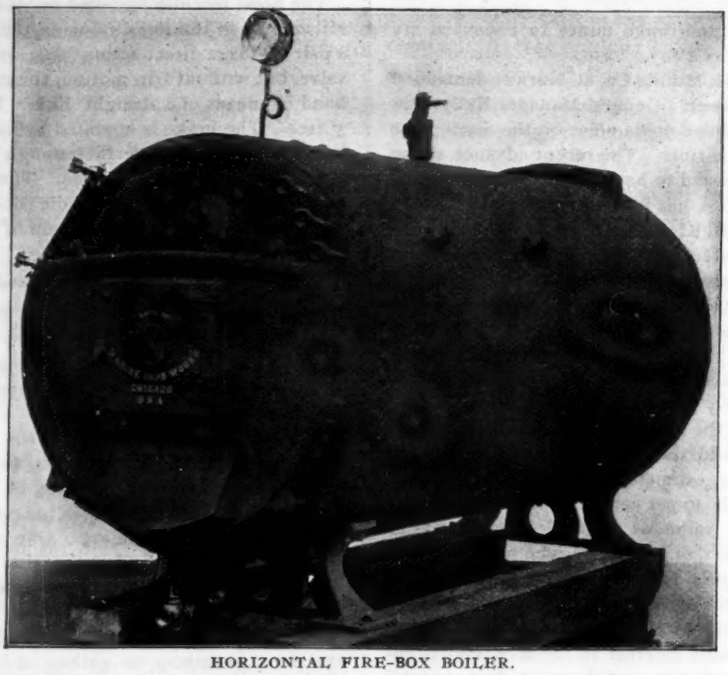
Prices per gross ton.	March 1.	April 1.	May 1.	June 7.
Old iron T rails, at Philadelphia.....	$11.75	$12.00	$12.00	$12.50
No. 1 anthracite foundry pig iron at Philadelphia.....	12.00	12.00	12.00	12.50
Gray forge pig iron, at Philadelphia	10.50	10.50	10.50	11.00
Gray forge pig iron, lake ore, at Pittsburg.....	8.95	9.25	9.40	10.55
Bessemer pig iron, at Pittsburg.....	10.15	10.60	10.75	12.00
Steel rails, at mills, in Pennsylvania	22.00	22.00	22.00	22.00
Steel billets, at mills, Pittsburg.....	15.00	15.35	15.75	18.10
Best refined bar iron, from store, at Philadelphia.....	28.00	29.12	30.24	30.24
Best refined bar iron, at Pittsburg.	24.64	24.64	25.76	26.88

Coke, iron ore, and labor have all advanced since March 1. The price of coke is expected to advance still further, and at an early day.—[Bulletin.

A WOOD BURNING MARINE BOILER.

Among the several types of boilers offered and built by the Marine Iron Works, of Chicago, one in particular is especially suited for small and medium size tonnage fueling with wood and carrying high steam pressure with very ordinary attention in the way of firing.

The horizontal fire-box type (water entirely surrounding the furnace), is cylindrical in form. The flat surfaces so objectional in the ordinary locomotive fire box marine boiler, are omitted; there are no "water legs" to choke up with mud or sediment; no weak joints or sharp angles that impede the proper circulation of the water and render high steam pressure dangerous.



HORIZONTAL FIRE-BOX BOILER.

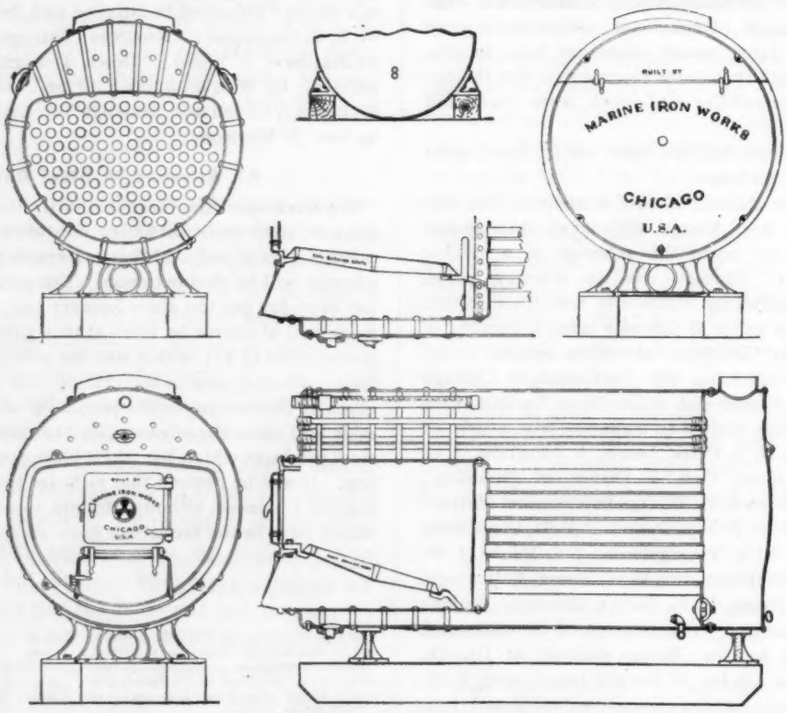
The illustration given herewith is of a boiler designed and built for use on a flat bottomed, stern wheel river boat where wood in three-foot lengths is burned. The boiler is mounted on substantial iron stands, when for use in flat bottom boats, but where used in deep water boats it is advisable to use lugs, as shown in engraving 8.

This boiler was designed and patented by Foreman Best of the boiler shop of the Marine Iron Works, of Chicago, who has had over eighteen years' experience on marine work.

That they are easily cleaned is apparent by an inspection of the engraving. Their steaming qualities, and therefore economy, are due to the rapid circulation of the water, which can best be attained by any boiler that is internally fired, and which has no water leg. The sediment pocket at the firing end of the boiler, below the fire-box, is so arranged that it is oftener in use than is usual on boilers of ordinary type, all of the sediment being removed by simply opening the blow-off. The door on the combustion chamber is hinged so that either top or bottom section or both sections may be removed, giving free access to the combustion chamber for cleaning purposes. Both fire front and back plates are attached to the boi er in a manner which makes them absolutely smoke tight, while the asbestos lining in the combustion chamber prevents uudue radiation of the heat.

The ample storage capacity for steam in connection with the dry pipe, renders a dome unnecessary and permits keeping the weight low down in the boat.

Care is exercised in the close and proper distribution of stay bolts and braces, and in reinforcing the holes cut and threaded for the steam fittings. As regards licensed working steam pressures and the usual dimensions of fire-boxes, for wood-burning boilers, together with size of engine cylinder suited, the manufacturers keep special and particular data.



WOOD-BURNING MARINE BOILER.

THE BUSINESS OUTLOOK.

FURTHER VIEWS FROM THE MACHINERY TRADE

In addition to the letters published last week we have received the following expressions from machinery and other interests on the improvement in their trade in the first five months of 1895:

Dietz, Schumacher & Co., manufacturers of machinists' tools, Cincinnati, O.:

Since last November we have been very busy, having all our hands working full time, turning out our 14″ to 24″ engine lathes, as well as our 52″ to 120″ radial drills. We have also put in considerable new machinery.

Brown Hoisting and Conveying Machine Co., manufacturers of conveying machinery, cranes, etc., Cleveland:

There has been a very great increase of business during the past five months in coal and ore-handling machinery and in cranes of various kinds. At present writing a night force is employed. There is every indication for continuous work during the rest of the season.

W. A. Jones Foundry & Machine Co., general foundry work, machine molded pulley castings, etc., Chicago:

With us the outlook is very encouraging. During the past few months we have branched out from a strictly foundry business, to manufacturing all the varied appliances of power transmission, such as pulleys, hangers, shafting, sheaves, couplings, collars, etc. We have increased our facilities somewhat, have our first catalogue under headway, and, as we have said, the future is very promising. We have done from 30 to 50 per cent more business so far in '95 than in the corresponding months of last year. Collections are still a little slow, but we think there is an improvement even now. We do not think we have struck a boom, but that the increase in business is a good healthy reaction and return of prosperity. With good crops, good times are assured.

Aurora Tool Works, manufacturers of radial drills and other machine tools, Aurora, Ind.:

Our business shows a very marked and encouraging improvement this year over that of last. Our sales for the five months of this year exceed those of the whole year of 1894 by several thousand dollars; and the sales of the month of April this year were greater than those of the last four months of 1894. We were idle at least one-third of the time last year. This year we have been running full capacity and part of the time extra time, and are still behind with our orders. While we have had to cancel a number of orders on account of the impatience of the purchaser. It seems now that a person desiring to purchase a tool is not willing to wait any length of time. Our revival of trade commenced in the East, and we have found it gradually working westward, while now Chicago, St. Louis and even San Francisco are beginning to wake up, rub their eyes and look surprised to see daylight once again. If the cholera would only come and kill off all the tariff tinkers in the United States we could feel assured of a few years of prosperity and be accordingly happy. We are satisfied with our present business.

Connersville Blower Co., manufacturers of rotary pressure blowers, gas exhausters and pumps, Connersville, Ind.:

Within the last two months we have noticed many signs of a distinct, and what seems to us, a permanent improvement in business. Our own trade is feeling the stimulus of better times. The foregoing statements, however, refer only to the volume of business being done, as prices remain very low, it being almost impossible under the present conditions to lift them to a higher level.

Jeffrey Manufacturing Co., manufacturers of mining machinery, elevating and conveying machinery, etc., Columbus, O.:

It is with a good deal of pleasure that we have to report that from the very beginning of this year we have noted a marked improvement in our business. We think that if there are no mistakes made at Washington in regard to the silver matter, and other matters which vitally effect the manufacturing industries of this country, there ought to be a steady improvement the balance of this year. We think that no lasting betterment can come until there is a change in the administration and a definite settled policy adhered to. We hope that other manufacturing companies throughout the country will be able to report to you as we have, that is, an improvement in their different lines.

Manning, Maxwell & Moore, railway and machinists' tools and supplies, 111 and 113 Liberty St., New York:

There is no doubt that there has been an increase in the volume of business in the past five months in our line of business, but there has been no material increase in profits; in fact, the prices rule extremely low, and are kept so by a lot of foolish people who think that is the only way they can sell goods.

Wheeler Boiler Co., manufacturers of Wheeler's vertical tube boiler, Sharon, Pa.:

Business is improving. We have more inquiries for boilers and orders are coming in more freely.

Armstrong Bros. Tool Co., manufacturers of patent tool holders, and dealers in machinists' tools and supplies, Chicago:

Business with us has been very satisfactory, with the exception, perhaps, that collections are somewhat slow. In looking over our books we find that our sales so far this year amount to fully one-third more than in the corresponding five months last year. Our traveling salesman reports that machine shops are beginning to show signs of old-time activity, and while there is a saying that all signs fail in dry weather, still it looks to us as though they point to a rushing business with us for the rest of the year.

Cady Mfg. Co., power presses and special machinery, Cleveland:

We have had a steady growth in our business for the last twelve months. We have noticed in the last five months more call for special, automatic, and other labor saving machinery than in our regular line of tools. The rate of increase in our trade is best illustrated by the fact that in March we were compelled to move to new shops, where our capacity is doubled, and also by the fact that we now employ four times as many men as we did one year ago. The outlook in all branches of our trade is excellent, and from all indications we think we will be obliged again to double our capacity within a year.

Bickford Drill and Tool Co., builders of machine tools, Cincinnati, O.:

We can say that the five months of 1895, as compared with those of 1894, show an increase of nearly 70 per cent and with an inclination toward the larger tools. We do think that the outlook is for the better.

Berlin Iron Bridge Co., builders of iron and steel bridges, buildings, roofs, etc., East Berlin, Conn.:

Our shipments during the first five months of 1895 have been about twice as great as the first five months of 1894. There appears to be no particular line in which our trade has expanded, but it has improved along the whole line, and present prospects are that it will be a good year in our line of business. We are decidedly of the opinion that there is a marked improvement along the whole line.

Ed. Wertheim, engineering and general mill supplies, German asbestos, etc., 55 S. Canal St., Chicago:

In my business I find a decided improvement has gradually developed during the last three months. I find not only that people who were hesitating three months ago to increase their stock are more ready to place an order but also I find that the collections are more satisfactory. It is my opinion that the prospects in my line of business at present are good, and I am looking forward to a continuance of good business and satisfactory collections of accounts.

American Fire Brick & Clay Co., fire brick and ground clay, Mineral Point, O.:

Our trade has increased and we are conservative in placing

the increase at about one-third more than to this time last year.

E. W. Bliss Co., presses, dies and special machinery, Brooklyn, N. Y.:

Our business has seen a gradual improvement beginning about the first of this year until at the present time we are quite full of work. If the improvement still keeps on we will shortly be running at our full capacity. We think the outlook is quite favorable.

CHEMISTS AND FOUNDRY IRON FURNACES.

The recent establishment of a chemical and physical laboratory by Rogers, Brown & Co., of Cincinnati, the well-known metal brokers, is a new departure in the technical world on this side of the Atlantic. The need of a chemist at iron works has long been recognized, long in one sense of the word, although it has been not more than 30 years since the first chemical laboratory in this country was erected in connection with iron and steel works. This honor belongs to W. F. Durfee, the veteran ironmaster, who in 1865, at the Wyandotte Works, near Detroit, built the first chemical laboratory that was designed exclusively for the use of steel works. It was in connection with basic steel, too, that this was done, for at that time he was making steel by the Kelly process. There is, perhaps, no part of technology that has seen such changes as the iron and steel trades within the past 30 years. From the laboratory at Wyandotte there has gone out a mighty influence, pervading the entire country and bringing into intelligent and harmonious co-operation the labors of scores of highly-educated scientific chemists. The word chemist is employed in its broadest signification, for the educated chemist is something more than a mere analyst. An analyst can do some things as well, perhaps better, than a chemist, but he has limitations that fall far below the more highly educated and more resourceful activities of the others. It seems that there is danger of confounding the analyst with the chemist, of expecting too much from the man to whom is paid a salary of $50 per month. If iron brokers can afford to build and equip a chemical and physical laboratory and engage the services of a competent man to take charge of it, how much more does it behoove the maker of the iron to see to it that the product as it leaves his furnace shall be as nearly perfect as it is possible to make it?

There is a tendency in the iron trade now to demand that certain grades of non-Bessemer iron shall have a definite composition, variable within certain limits it is true, but still conforming to certain specifications. This movement is perhaps more perceptible among those furnaces that can use from one year's end to the other fairly uniform stock. They are able to say to purchasers that their iron is of a certain composition and will be sold on that understanding. The uniformity of their stock or the special needs of their customers, or both, enable them to take advantage of the desire among buyers and users to know just what they are getting. The tendency to buy and sell on analysis is, of course, more strongly accentuated in times of depression than when the yards are empty and purchasers plentiful. It is a common saying that when the market improves there will be less said as to analysis, and that we shall go back to the good old times when iron was iron and the chemist an ornament. It may be so, but if purchasers find it to their advantage to buy on analysis during a dull season why should they not demand the same concession when the price goes up? When the price is low iron producers are very apt to be more careful as to their choice of materials going into the furnace than when there is a ready sale for almost anything they can turn out. The iron made under these conditions is more apt to be good than when things are booming. If there is reason for the careful inspection of iron made during a depression there is far more reason for a careful inspection when the price has improved.

In both cases it is the buyer that sets the fashion. In the long run he gets what he demands, and if it is good for the buyer to know what he is getting, why is it not good for the maker to know what he is producing? In respect to the quality of the iron the interests of the maker and of the user are identical and the truest economy is when there is harmony between these two.

In the grading of ordinary foundry, mill and forge iron the need for the chemist is so patent that it is needless to discuss it. This becomes more and more pressing as the stock varies. With uniform stock there is uniform iron, with varying stock varying iron. The variations are very often quite beyond the skill of the ordinary grader, who depends upon color, fracture, granulation, face and anything else that his experience may have taught him. He may grade, and as a matter of fact does grade, as No. 2 foundry irons with 2.50, 2, 1.75, 1.50, and even 1.25% of silicon, simply because he does not know in what other grade to put them. If a shipment of No. 2 foundry with 2.50% of silicon is made and the user is pleased with it and orders more of the same grade and gets an iron with less than 2% of silicon or even as low as 1.50%, there comes a complaint. These discrepancies are ascribed to the varying nature of the stock, or almost any other excuse. The solution of the whole matter lies with the chemist. If he occupies his rightful position and is consulted as he should be, the cause of the variations in the iron could be traced to its proper source. If he cannot do it, try another man. But give the chemist all the information and assistance he needs before deciding that he cannot solve the question. If need be let him have the furnace for his laboratory and the foundryman as chief assistant, and let them work it out. In nine cases out of ten these two can arrive at the cause of the trouble and find a remedy for it.—[Wm. B. Phillips in Engineering and Mining Journal.

Western Foundrymen's Association.

The next meeting of the Association will take place at the Great Northern Hotel, Chicago, at 7:30 P. M., on Wednesday, June 19, 1895. The executive committee earnestly requests that at this meeting, which will be open for general discussion and interchange of experiences in foundry practice, there may be a full attendance of all interested in the association and its objects. Former meetings of this character have proved exceedingly interesting and profitable, and it is expected that this one will be equally so. The secretary, Mr. S. T. Johnston, 1522 Monadnock Block, Chicago, in his announcement of this meeting, requests anyone who has any question relating to foundry practice he would like to have discussed, to send it to him in writing a few days before the meeting.

New Wrought Pipe and Tube Discounts.

At the meeting of the wrought iron pipe and boiler tube manufacturers held at Pittsburg, June 4, the following discounts were adopted on merchant pipe. They are equivalent to an average advance of about 10 per cent:

Lap weld black, base	75 per cent and two tens.
Butt " " "	67½ " " " " " "
Lap " galv. "	65 " " " " " "
Butt " " "	62 " " " " " "
Boiler tubes 1¼" and smaller,	72½ and 5 per cent.
Boiler tubes 2½" and larger	75 and 5 per cent.
Casing screw and socket joint	60 per cent.
Casing inserted joint	55 per cent.

These discounts are on the list adopted Jan. 29. It is stated that there is no present intention of changing card prices.

THE report connecting the name of Rockefeller with a steel works investment having a Lake Erie site has not been telegraphed for some months. It came out again last week. This time the special embellishment is that the new plant will rival those at Homestead and Bethlehem in the production of armor plate. John A. Potter, manager of the Cleveland Steel Co.'s sheet mill, is spoken of as the inventor of new processes and appliances for the manufacture of heavy ordnance and armor plate, and these are said to be the foundation of the proposed company's operations. It should be said in justice to Mr. Potter, that he has not sanctioned nor inspired any of these reports. It is true that he has obtained patents on processes of plate manufacture, but there are no plans for a plant at present, and it is just as certain that neither John D. Rockefeller nor Frank Rockefeller has in contemplation any investment in a steel plant on the south shore of Lake Erie.

THE Mahoning Ore Co., whose properties are near Hibbing, Minn., will work its No. 2 mine by stripping and milling. It has a surface of 35 to 50 feet. The company's steam shovel property will be shipping early in July.

PUBLICATIONS RECEIVED.

The Merchants' Exchange, Buffalo, Wm. Thurstone secretary, has reprinted in pamphlet form a lavishly illustrated article on Buffalo, written for the March *Forum* by Frank Presbrey. Elevator and transportation facilities and commercial buildings are given prominence in the views.

The Calendar of the School of Mining, Kingston, Ont., just issued for 1895-96, details the various courses pursued, embracing three years' courses in mining engineering and in analytical chemistry and assaying, for a diploma, and four years' courses for a degree in mining engineering, chemistry and mineralogy and geology. Prof. Wm. Nicol has charge of the work in assaying, metallurgy and mineralogy; Willet G. Miller, of geology and petrography and Wm. Hamilton Merritt, of mining engineering and ore dressing.

Warren Webster & Co., Camden, N. J., in their latest pamphlet devoted to the Williames "Vacuum" system of steam heating, have marshaled testimony of many users in support of their claims. Defining the scope of the apparatus, the booklet says that it "is simply an attachment whereby a partial vacuum is maintained in the piping, thus insuring perfect circulation throughout the heating coils, and as the steam is circulated at reduced pressure, the amount of condensation is lessened per square foot of heating surface, avoiding the usual repairs to piping, leaks, etc., where the pressure is above the atmosphere to induce circulation. Exhaust steam is utilized by it, without any back pressure on the engine, so that the cost of both power and heat is no greater than the cost of power alone; and when applied to plants in which live steam only is available for heating at high pressure, it is almost equally valuable." Attention is drawn particularly to two things: First, that a saving in fuel of from 10 to 40 per cent is secured by the system; second, that no material change in existing pipes is necessary.

"Big Four Industrial Series" is the name of an attractive publication, containing 32 pages of reading matter and many well-filled advertising pages, the first number of which has just been issued by the passenger department of the C., C., C. & St. Louis Ry., Cincinnati. A special feature is made in this initial number of articles on wood and iron working machinery. Descriptions are given of machinery made by prominent Cincinnati manufacturers, including the Lane & Bodley Co., whose well known slide valve Corliss engines are illustrated and described. Views are given of manufacturing plants at Cincinnati, Ivorydale, Hamilton, O., and Terre Haute, Ind., points on the Big Four line. In the introductory article it is stated that the publication is devoted to the development of the resources of the Big Four territory and to the promotion of its mercantile and manufacturing interests. One department is given up to a list of new enterprises in Big Four districts, projected manufacturing plants, machinery and supplies needed, and other information of value to manufacturers. For the next issue a special feature will be made of vehicles and implements, grain and live stock. E. O. McCormick, the passenger traffic manager of the Big Four, has thrown his accustomed energy into this newly started publicity department, and the number before us gives tokens of a distinct success. The editor, Mr. J. T. Brown, is well known in Cincinnati as a writer on industrial topics.

L. M. Moyes, patentee and manufacturer of the Combine safety water tube boiler, has published an eight-page address to steam users, which emphasizes the features his experience has demonstrated to be requisite to the highest efficiency of the steam generator. Imperfections which the makers of well known boilers have been striving to remove were first in mind in the designing of the Combine, and in the little treatese before us Mr. Moyes goes into details in a way that shows his long familiarity with the practical side of boiler construction and operation. The pamphlet is a business-like document that is entitled to a careful reading.

The "Steam Separator, Its Object, Action and Application," is the title of a little paper-bound hand book issued by Chas. D. Mosher, No. 1 Broadway, New York. It treats of the author's device for the extraction from steam of oil, water or other matter, so that only dry steam shall be delivered to the engine.

NATURAL OR SUCTION DRAFT CUPOLAS.*

BY THOS. D. WEST.

There is at the present day much dissatisfaction and uneasiness among progressive founders on account of the extravagant fuel consumption, burning out of linings, the bung ups, etc., in remelting cast iron. Most all believe that we should utilize more of the fuel than we do and many fail to perceive why we cannot design something that can exceed the economy of the common straight cupola having two or more rows of tuyeres, such as have been in use for about 50 years. When we consider the claim that about 59 pounds of coke is sufficient to melt a ton of iron and that the best result generally obtained by actual practice is about 250 pounds of coke per ton of iron, we are certainly justified in encouraging the introduction of any new designs that affords any fair promise of success, however radically they may differ in principle from our present methods.

Blast furnacemen have so far outstripped the founder in advancing the science of melting that no one who has a speck of pride in him for the founder's art, should sit down contented with our advancement from the old Catalan, but lend a hand to get out of the rut in which we have furrowed for nearly 100 years.

Most all readers of foundry literature will remember the writer's experiments with "center blast" which were published about 19 months ago in many of our leading papers, the subject being first introduced by him in a paper before the Western Foundrymen's Association, Oct. 18, 1893. Later experiments have only further sustained the advantages of a center blast which I claimed at that time. Knowing what I do of the advantages of center blast, I have been led to study means for its best application. The natural blast cupola gives opportunity for the effective employment of a center blast in assisting advancement of cupola practice. With center blast attachment, I have a strong conviction that natural or suction draft cupolas can be made a success and achieve a very commendable advancement in cupola practice.

In a discussion on a paper treating of "The Herbertz Steam Jet Cupola," which was presented by Mr. J. B. Nau before this Association, Oct. 5, 1894, I called attention to the advantages of center tuyeres to aid natural draft cupolas. The appearance in print of that paper with its discussion in the *Iron Age*, *The Iron Trade Review*, and *Foundry* resulted in the last journal illustrating the workings of a natural draft cupola which was used successfully in Allen's foundry, Springbank, Glasgow, Scotland, in 1854. The writer of the article, Mr. J. McCash, says in the April number of the *Foundry* that the metal produced was hot enough for such light work as stove plate and hollow ware. Since the appearance of Mr. Nau's paper last October, I have given much study to the question of natural draft and the appearance of Mr. McCash's paper has encouraged me to present at this time my original design of a natural or suction draft cupola as seen in Figs. 1 and 2. And I cannot conceive why the principles involved in the design shown should not prove successful.

The natural draft cupola illustrated by Mr. McCash in the *Foundry* probably presents the best success with which natural blast cupolas have met and I largely attribute this to the fact of the Allen cupola being of an oblong shape which admitted of air reaching the center body of its fuel much better than had it been of a round form. I am much indebted to a paper by M. A. Gouvy, Jr., on the different designs and principles in the cupola, which was translated from the French by W. F. Durfee, M. E. for the Franklin Institute and appeared in the journal of the Institute in December, 1888 and January, 1889. This paper cites several instances of ill success with natural or suction draft cupolas. In a study of the reason which can be assigned for their failure, I first found that every time a charge of stock was admitted to the cupolo, a large area was opened which admitted such a volume of air at the top as to cause a decided check to the draft. All founders know that any temporary lull, no matter of how short duration, with force blast, checks the speed of melting and often results very seriously in causing "bung-ups" and shortening the length of a cupola's heat. The second bad point I found

* Read before the Foundrymen's Association, Philadelphia, Pa., June 5, 1895.

lay in there not being sufficient tuyere area and means for regulating the same according as the atmosphere influenced the draft which is seldom found two days alike, no matter how high a chimney may be constructed. The third drawback I found was in not providing methods for the proper deliverance of slag, and prevent its rising to a level of the tuyeres, as it can easily do in a cupola as the length of a heat advances if not properly arranged for.

The writer has endeavored in the design here presented to overcome the things which to his mind have prevented the success of natural draft or suction cupolas in the past. How far he may have succeeded will be best decided by a practical test and which could be most economically done by anyone having one or two high chimneys conveniently located to which the draft for such a cupola as here shown could be connected. It is said that two chimneys of a medium height may often work better than one very high one. Fig. 1 (I have given all the dimensions necessary for construction) shows a 40 inch cupola, mainly for the reason that this size is about mid-way between those in general use. To build smaller or larger cupolas than that shown, I would advise following the horizontal proportions and increasing or decreasing the vertical proportion by increasing or decreasing the height one-half of the measurement that the diameter proportions are increased or decreased. The total tuyere area for any size of a natural or suction draft cupola should range from 60 to 70 per cent of the area at the cupola's largest inside diameter. The area of the continuous tuyere A is to be found by dividing the largest area of the cupola by two and the first row of tuyeres by nine, the uppermost row M, by 20 and the center draft tuyere N N by dividing the largest diameter of the cupola by 35.

It is well to have the bottom or hearth portion of the cupola constructed wholly independent of the bosh and stack body so that a perfectly continuous tuyere opening can be obtained as seen at A. The upper and lower plates protecting the brick works at this tuyere are made of cast iron about 1½" thick, the upper plate being best constructed of one continuous circle, whereas the lower plate could be in sections if so desired for convenience in being replaced should they crack or be burnt out in any way from outflowing metal. The upper plates are held in place to support the upper brick work by having a flange project upward on the outside and bolted to the shell as shown. To aid in supporting the brick work in the bosh and stack portion, angle iron as seen at D should be placed around the inner portion of the shell about every two feet in height. The same columns used to support the bosh and stack portion of the cupola can, by having projecting flanges, as seen at E, Fig. 1, also carry the hearth portion and this body can be raised or lowered so as to increase or diminish the height of the continuous tuyere by means of "blocking" or jack screws placed between the flange E and the cupola's bottom plate as shown at F by making the difference between the flange and bottom plate greater in distance than shown. "Blocking" is preferable to jack-screws, etc., as the latter, in many foundries, can be made readily inoperative at such points by means of flying sparks of iron or dirt getting

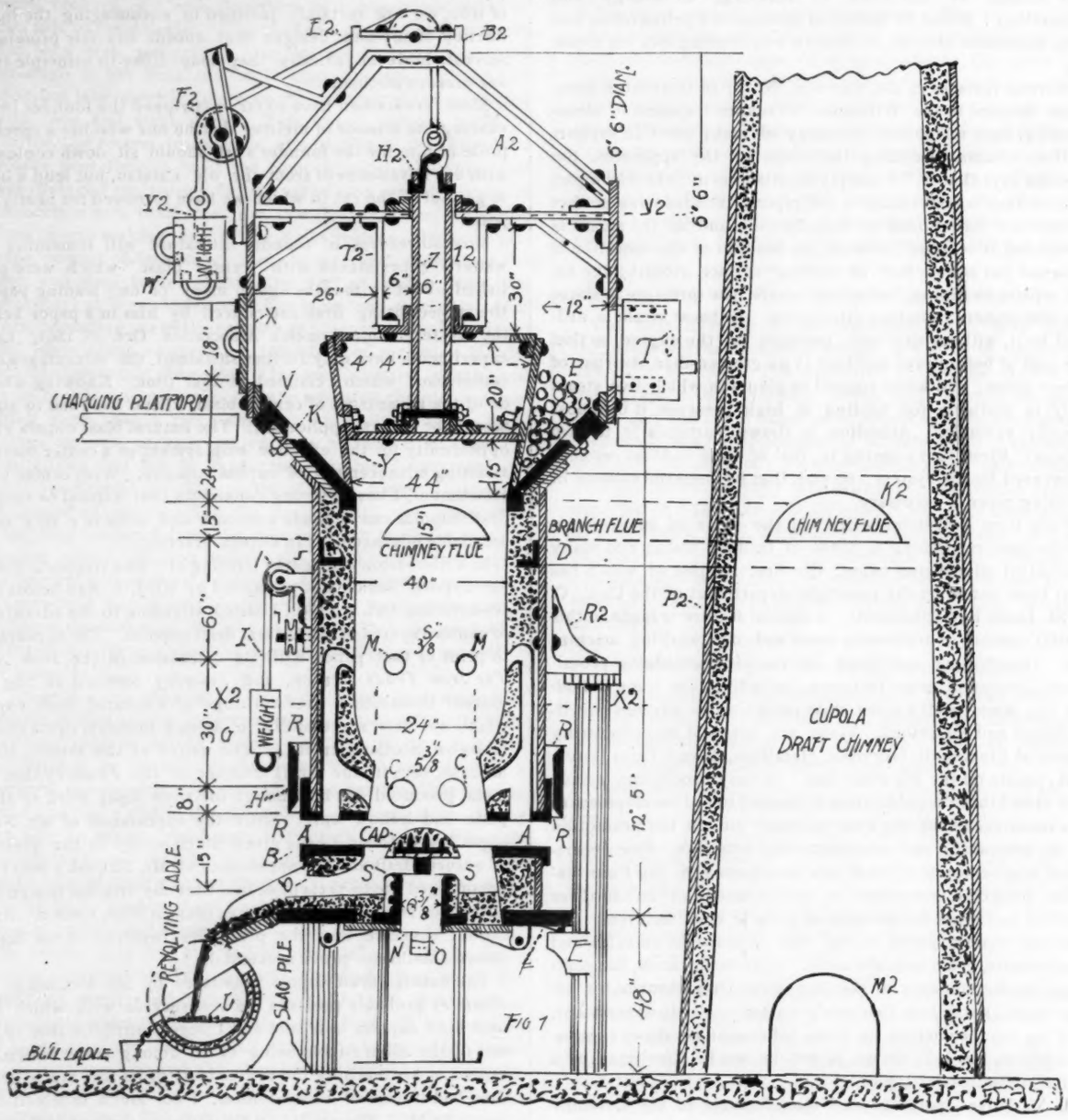


FIG. 1.

in between the threads of the screw or nut, or joints of levers.

To regulate the draft, a wrought iron gate belt about a half inch thick is made to encircle the cupola as seen at H H Fig. 1 and in the plan view, Fig. 2. To raise or lower this belt, a weight G is used having two wire ropes I, passing over the pulleys J J, best seen in Fig. 2, the rope after passing over these pulleys J J are then carried down to come under pulleys or small sheaves seen at L in Fig. 1, passing from these to sheave wheels at right angles to L, secured opposite each other on the cupola's shell. At this point the rope branches off in two directions on each side to connect with the gate belt at the points 1, 2, 3 and 4, seen in Fig. 2. Should it be desirable to secure this gate belt closely around the tuyere opening A, so as to shut off all possible admittance of draft, this can be readily done by adjusting or tightening screws or clamps at the points A A, Fig. 2. To stop all draft passing through the center tuyere, a door is hung having the lug O, Fig. 1 for support at one side and a latch catch at the other. When these two openings are closed, in connection with stopping the breast with clay or sand and closing the chimney valve flue, we have a condition practically the same as that implied in the "banking of a furnace." To be able to thus bank a cupola, is a question worth raising. It is hard to predict how far this procedure may be utilized when the design of a cupola is such as to make it a success, as can be done by the design I herein advance.

As an example of benefits to be derived from banking a cupola, I can remember when working for the Cleveland Rolling Mill Co. as a journeyman molder, some years ago, it was a common occurrence for this shop to take off two heats a day without dropping bottom. I was often called out in the middle of the night with a few helpers and cupola men, the latter to get his cupola ready, the former to assist me to mold up some broken casting or fix for the burning on of the neck of some broken roll and generally cast it between the hours of five and seven in the morning. After the iron had been melted out of the cupola, the breast hole would be enlarged and the slag would be pulled out as it accumulated for about 15 minutes, after which the breast would be closed up, with clay or sand and all tuyere holes etc. made air tight as possible. Then, after a few shovels full of coke had been charged on to give a little fresh fuel to the bed, the charging door was closed and the cupola let stand in this condition until it was time to commence charging for the regular afternoon heat. Where a cupola is designed so as to be properly slagged and so as to prevent entirely any admission of air to the fuel by leakage through the tuyeres, shell or otherwise, it is possible in shops that could use iron of a dullish nature at the first few hundred melted to run a cupola all week with daily heats if iron is fairly clean without dropping bottom or pulling out all the "bed" Before leaving this subject of banking a cupola, I would call attention to the gate belt H in Fig. 1 being made with a taper recess at the outer edges as seen at R R. This admits of packing the joints around the circumference of the gate belt and tuyere opening with clay to make the joint completely air tight.

Attention is now called to a new device designed by the writer for admitting charges of stock to a cupola. It is stated in the fore part of this paper that all natural draft cupolas of the past could not admit stock to the cupola without an inrush of air occurring at such times to check the blast. The method which I have designed to overcome this evil is very simple in its arrangement as the following shows.

After the stock is charged around in the space at K as seen on the right at Fig. 1, the charging doors as at T are then closed as seen at X on the left and then by pulling on the weight W the conical cylinder Y (made conical to pull out of the stock easily) is raised and the stock slides down to fill the cupola. According to the speed with which the closing cylinder Y is raised so can the locating of stock be largely regulated as to its being chiefly charged to the outer or inner circle and thus afford facilities to arrange the fuel and iron at any desired portion of the cupola's area. This is a very essential point to insure uniformity in melting and lessoning the chances of "bung-ups" and short lived heats. Even where the charging arrangements as shown are not necessary for preventing an inrush of air at the top every time stock is delivered to the cupola, the point of insuring evenness and any desired distribution of stock in charging in itself recommends the adoption of such a charging device as here illustrated.

The principle involved in the charging device shown is one which could be easily arranged to make it practical for application to our present force blast cupola by having the stack made independent of the cupola above the bottom of the charging door and a closing gate belt psss down over the charging opening something after the idea indicated in opening and closing the continuous tuyere seen at A A and H H, Fig. 1. With such a device for charging our present force blast cupolas, it would not be necessary to have any arrangements to prevent the admittance of air when the stock was delivered to the cupola, and hence all the top house covering enclosure forming the top and outer shell of the cupola as seen in Fig. 1 would be omitted. Such an arrangement for our present force blast cupolas would not only insure better uniformity in level charging, but would also greatly lessen men's exposure to heat when charging a cupola. This in itself is a factor in summer seasons making such a device of much value, as nearly every founder knows that men often shirk their work in charging to an extent often causing poor iron or "bung-ups."

Some might raise objections to such a device on the ground that it would not admit of charging massive pieces of old castings or scrap iron. As arranged in Fig. 1, the charging cylinder cone Y can be raised two feet and if this is not sufficient, the design may be modified to obtain any height desired. It will not be out of place to say that when it is necessary to charge massive pieces, this should be done after the bed or first layer of iron has been charged so as to have the heavy pieces in the cupola lying in the last one or two charges near the top, and this should be done before the draft gates are opened to start the process of melting. It will be seen also that the principle involved in the charging arrangements will admit of raising the charging cylinder cone Y up out of the way to admit good light to the cupola or the entrance of a man in making any repairs or lining a cupola, and also permit of the fullest freedom in passing down kindling to form the bed for first firing, or iron for the first charges in the cupola. The cone Y cannot drop into a cupola should the rope break. This charging device is entirely original and new as far as the writer has any knowledge, and is a line in which improvement in our present practice should be made.

This cupola being of a design which can largely dispense with our present necessary evil of tapping out or stopping up, is another new element which is an advance over our present practice. In long heats or where much slag is created, it might be necessary to have a blow pipe or a jet of gas burn at the breast hole so as to prevent the slag chilling as it flowed out against the draft pressure with the iron. But as the majority of foundries do not run long heats to the extent of creating much slag or use "dirty iron," this element, in the majority of cases would require but little consideration. At the first meltings, it might be found necessary in some foundries to bank the breast to a height of about the top of the center draft tuyere, so as to insure a body of metal quickly collecting in the revolving stand ladle seen at the spout of the cupola, Figs. 1 and 2. After a body of metal of about the height shown is collected in the stand ladle, the slag which will emanate from the cupola to float on top of the metal in the stand ladle should so hold the heat of the molten metal as to provide sufficient fluidity in the metal coming from the stand ladle to pour light work as well as heavy. For obtaining different degrees of fluidity as it comes from the cupola to the stand ladle we have recourse to the same methods which we use with forced blast which, with natural or suction draft would simply mean regulation of fuel and the height of continuous tuyere or draft opening at A.

It will be noticed that I have planned a new form of stand ladle, one which can empty itself of iron on one side or slag on the other without having to stop the outflowing stream of iron in its passage from the spout to the stand ladle and which is, as far as I am aware, a new feature in stand ladles and an advance in cupola work. This stand ladle, as shown in the plan view Fig. 2 is designed to be turned by hand, by means of the ordinary shank handle, but if desired it could be turned by means of spur or worm gearing.

The center draft tuyere shown can be made of cast iron or boiler plate, but in either case some form of projections must

be provided to assist in supporting the fire clay with which they are lined to protect the metal part of the tuyere from the melting heat of the cupola when they are placed in the position shown. The clay should be of a good quality to resist heat. The cap seen in Fig. 1 forming a cover over the center draft tuyere to prevent the metal in dropping down from entering the center tuyere S, is formed of clay having a pronged plate, as seen at Fig. 5, in its interior (Fig. 1.) to give it strength to withstand the melting heat and pressure of stock. This cap can be supported above the center tuyere by letting it rest on three small pieces of fire brick equally divided around on the top edge of the center tuyere at S. Or it can have a shaft which will form part of the plate as shown in Fig. 5 by the dotted line, to pass down through cross bars indicated by dotted lines B B B in Fig. 4. Then, by means of a key or small rod inserted through the shaft at the hole K, Fig. 5, the cap will be sure to follow the center tuyere in dropping with the bottom.

This latter plan of fastening the cap where long heats are run or poor grades of iron melted would be the best to adopt, but otherwise the first plan suggested would be best, as it permits a larger area for the admittance of draft. As will be seen by Fig. 4, flange E is provided at the lower end of the casting so that should there be any tendency for the bottom to hang when the doors were let down the point of a bar could be set in on the flange, with the bottom of the cupola for a heel, to pry the center tuyere down and bring the bottom with it. Users of such center draft tuyeres and caps as herein described should have two or three pairs always on hand and these should be daubed up or formed aside from the cupola and dried in an oven and all cracks filled up, so that when they are placed in the position shown after the bottom doors have been put up there will be no risks taken in soft clay being displaced or sagging down or creating an opening to permit the heat attacking the iron portion of the center tuyere or cap. It will be noticed that the draft entrance of the center tuyere is lower than that of the continuous tuyere A. This is to keep the center tuyere as low as possible in the cooler portion of the incondescent fuel forming the bed. At the same time it permits the carbonic acid (CO_2) which is created at the vicinity of the opening S to receive more oxygen at the continuous tuyere entrance A. This overcomes to a large degree the tendency of the rising carbonic acid to become carbonic oxide (CO) and the tendency is still further counteracted as the gases ascend past the upper row of tuyeres at C, so that when the gases created below in the "bed" of fuel have reached the "melting point," the carbon which was liberated from the fuel in the "bed" is chiefly in the form of CO_2. This form is well-known as that essential to best promote melting and obtain perfect combustion. After the gases pass the "melting point," more oxygen will be admitted at the uppermost tuyeres in the zone at M, and there again have the escaping CO largely converted to CO_2, and thus cause a higher heat in the upper zones to the better prepare the descending iron stock for reduction to a liquid state when it reached the melting point and also prevent the escape through the chimney flue of many calories or units of heat that otherwise would pass off as unutilized gas in the form of carbonic oxide.

As economy of fuel is the only quality which many seem to think we should seek—and in this regard a mistake is made—it will be well at this point to discuss how natural or suction draft gives us promise of the largest economies in all that pertains to the best methods of remelting cast iron. The first advantage from natural draft cupolas, the Bradley type as well as present forms, to which natural or suction draft is applicable, is that fuel is not necessary to raise steam to run fans or blowers. One shop may burn as much fuel to raise steam for a fan as is used in the cupola to melt iron. Another loss with the fan is in iron clogging, around the tuyeres, due to the

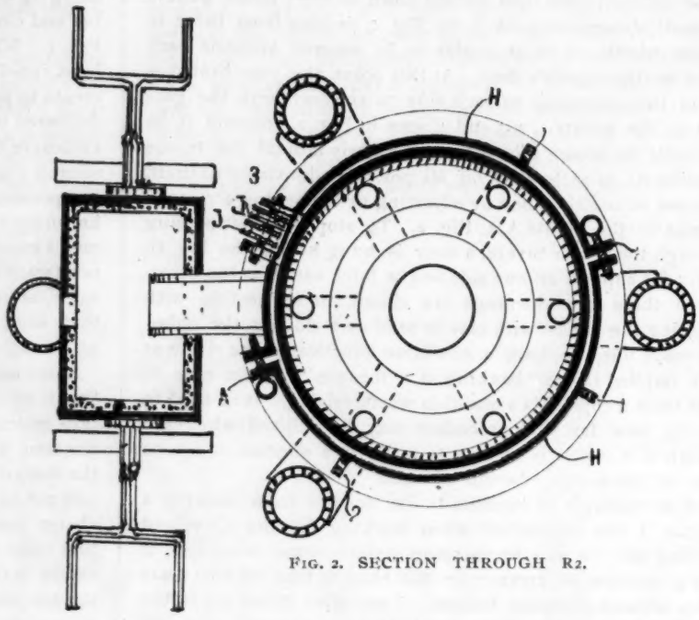


FIG. 2. SECTION THROUGH R2.

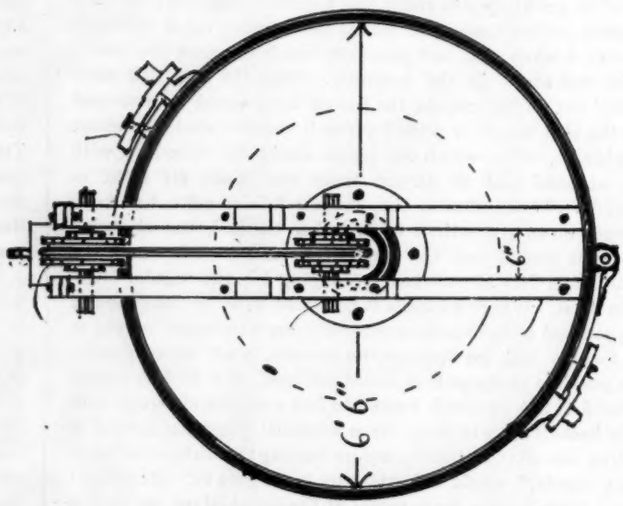


FIG. 3. SECTION THROUGH V2.

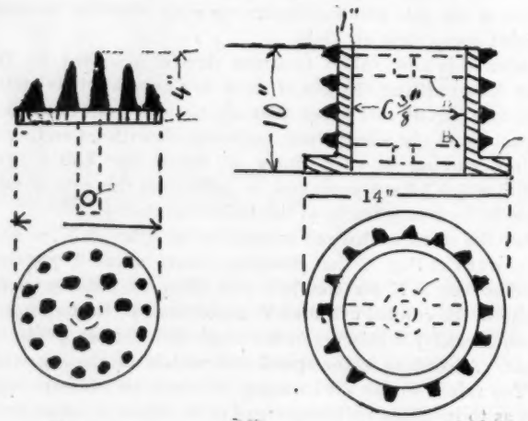


FIG. 5. FIG. 4.

force of the blast at the tuyere entrance chilling "droppings," which require labor to extract from the dump pile or tumbling barrel, while some of the "droppings" are so fine or so contaminated with the refuse that they are never found. There is also a loss of fuel by reason of it being chilled in mixture with iron at the tuyeres and debris sticking to the walls of a cupola

which requires to be picked off in cleaning out and preparing a cupola for its coming heat. This would be largely prevented in natural draft cupolas. A natural draft moreover is less destructive to linings owing to the fact that we know a mild force blast is much less injurious to a lining than a strong forced blast. Again, the expense is saved of keeping up repairs of belts, shafting, pulleys, fans, and all the appliances that are necessary to accompany a cupola using forced blast. There is a saving also in expenses often incurred by reason of bad castings and stoppage of work due to break-downs of appliances, in the form of fans, belts, pulleys, shafting, engines, etc., in a shop using forced blast.

A consideration of the above points suggests that the word economy as now generally applied to cupolas, has a broader significance than merely the amount of fuel burned in a cupola to melt a ton of iron. Although a high chimney may cost more than a boiler, engine, fan, shafting, pulley, belts, blast pipes, etc., it has the advantage of being the less liable to break-downs and greatly lessens the founder's dread of the unexpected happening just when it could cause the greatest loss and find him the least able to combat its disastrous effects. Losses from such sources can in some foundries be more in one year than would pay for a high chimney or two medium chimneys. While we must acknowledge that there are days when chimneys may have little or no draft, no matter how high they are, still this should not debar us from making an effort to utilize natural draft, as this objection could be often largely overcome by building a small fire in the bottom of the chimney through an opening, as at M2. Then, again, there are methods by which we could compel or obtain a suction draft. I have not gone into the question of proportion and height of chimneys in this paper as space forbids its treatment and it is a subject of secondary importance to the one discussed, which relates merely to the practicability of melting by natural draft. As regards the cost of the cupola shown it should not exceed that of our present cupolas when we consider the high stacks and blast pipes, etc., required; and as the chimney takes the place of the engines, etc., the total expense should not be far from equal in both principles.

When a founder endeavors to realize the striking contrast in practice between natural blast and force blast in so far as it relates to questions of economy in fuel and linings, and affording him a certainty of ending a heat when once started without having a stoppage due to a break-down, and also the satisfaction of being able to look into a tuyere or poke it out without danger of getting blinded; and again how perfectly tuyeres could be controlled combined with the assurance and comfort with which molten metal could be withdrawn from a cupola without tapping out or stopping up, I think he will concede that the method advocated by this paper is one worthy of serious consideration.

It is not a question whether iron will melt by natural draft, for this is demonstrated to be practical in the Allen cupola and is often done even in our present cupolas before the blast is put on, and to stop the iron from melting, tuyere openings are often closed to shut off natural draft. But the question is, can we melt fast enough by natural or suction draft? I believe time will demonstrate that we can. One thing, however, is evident, if we cannot melt fast enough with natural draft, we should do so with suction draft; and inasmuch as suction draft is not incompatible with the use of the cupola herein illustrated, with its several accompanying advantages and improvements, the design is commended as one means of escape from the rut in which our cupola practice has gone for so many years.

NEARLY every department of the mills at McKeesport, Pa., is being operated to its fullest capacity. For the past six weeks the shipments of the National Tube Works Co. have exceeded those of any corresponding length of time in two years.

TWO of the four blast furnaces projected by the Carnegie Steel Co., for the tract adjacent to the Duquesne steel works will be built this year. The steel works will be rebuilt and extended to adapt it to the increased capacity for pig metal.

STACK No. 2 of the Isabella Furnace Co., at Sharpsburg, Pa., recently out for repairs has just been blown in.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review* and we will put you in communication with our advertisers at once.]

The Kendall Automatic Oil Pump Co., of Nashua, N. H., has been incorporated, with a capital stock of $30,000.

The Shattuck & Babcock Co., De Pere, Wis., will put in a 750 to 1 000 horse-power steam plant to be used during low water.

Fred Sage, Box 302, Emporium, Pa., is about to purchase a full line of equipment for a machine shop. He will receive proposals from manufacturers.

The National Jack Co., of Augusta, Me., has been incorporated with a capital stock of $100,000. The officers are: G. W. Fifield, president, of Lowell, Mass., and J. J. Donovan, of Lowell, Mass., treasurer.

The Abernaqui Machine Co., of Walpole, N. H., has been incorporated, with a capital stock of $60,000, to manufacture gasoline engines and package filling machines. The incorporators are John H. Osterburg, president, and F. M. Gilbert, treasurer.

The Ingot Machine Co., Newark, N. J., has been incorporated to make and sell machinery for casting steel ingots. The factory will be located in Newark, N. J. The capital is $300,000 and the incorporators, Benjamin Atha and John and Robert H. Illingworth.

Bids will be received by the Niles Tool Works Co., Hamilton, O., for the erection of a new steel foundry building. Bids will be received for the entire structure or for separate parts, such as steel frame work, roofing, glass, carpenter work, brick laying and masonry.

The Duplex Car Co., of Bristol, N. H., with a capital of $1,000,000, to manufacture and deal in all kinds of steam, electric, horse and cable cars and their equipment, making a specialty of the duplex car. Ex-Gov. Tuttle is president, and Austin Hayward Roby, treasurer.

Proposals will be received until June 28, for duplicating the pumps and machinery, with surface condenser, at the new pumping works at the Presidio of San Francisco. Information furnished upon application to A. S. Kimball, Deputy Quartermaster General, Chief Quartermaster, San Francisco, Cal.

Additions, Enlargements, Removals, Etc.:—

The Automatic Machine Co., of Aurora, Ill., will erect a new factory building.

The Metallic Mfg. Co., of Coopersburg, Pa., has commenced the erection of a new two-story building, 100x36 feet, and a two-story building 36x36 feet as an engine and boiler house.

Poorman Mfg. Co., has removed from Canton to Pique, O., where it is prepared to give prompt and efficient service. A complete line of sheet metal working machinery will be made.

Zug & Co., Ltd., proprietors of the Sable Iron & Nail Works, at Pittsburg, have about completed the erection of a new sheet mill. It contains two trains of rolls, and will have a capacity of about 80 tons of sheets per week. The building was erected by the Shiffler Bridge Co., of Pittsburg, and Mackintosh, Hemphill & Co., furnished the engines and rolls. The concern will roll iron and steel sheets from 18 to 30 gauge.

New Construction:—

Wm. Griffin, of Pittsburg, one of the first in this country to enter tin plate business, will soon erect a new plant at North Washington, Pa. It will cost $150,000 and employ about 300 hands.

The Western University at Pittsburg, is planning a $30,000 electrical building, with power and electrical equipment costing $70,000, a mechanical and engineering building to cost with its equipment $100,000 and shops 80x100 feet to cost $80,000.

It is reported that a plant for the manufacturere of cold drawn weldless steel tubing is soon to be erected in New Castle, Pa. John Stevenson, Jr., D. C. Wallace, I. C. Roberts, T. W. Phillips and L. S. Hoyt are mentioned as stockholders. Mr. Stevenson is the superintendent of the New Castle Wire Nail Mill, the Shenango Valley Steel Mill and the New Castle Rod Mill; and Mr. Roberts is superintendent of the Lozier

Tube Works at Ellwood City. The main building will be 600x110 feet.

Fires and Accidents:—

The pattern shop of the Indiana Machine Works, at Fort Wayne, Ind., has been destroyed by fire.

At Pottstown, Pa., the foundry of March, Brownback & Co. was burned with a loss of $35,000 to $40,000, partly insured. The principal loss was on patterns and machinery.

General Industrial Notes:—

The Glendon Iron Co., of Easton, Pa., will soon blow in a furnace.

The Isabella Furnace Co., of Pittsburg, has blown in its No. 2 stack, which has been undergoing repairs.

The National Tin Plate Co., Anderson, Ind., is now arranging for machinery for two additional mills.

The Pennsylvania Steel Co., has posted a notice of 10 per cent advance in wages. It affects 4,000 men.

James McKay & Co., proprietors of the Iron City Chain Works, Pittsburg, advanced wages 10 per cent.

Risdale & Lewis, dealers in machinery and supplies, failed at New York. Liabilities, $100,000; assets, $8,000.

Negotiations are on foot looking to the resumption of operations at the Soho Works of Moorhead-McCleane Co., at Pittsburg.

The spiegel furnace of the Lehigh Zinc & Iron Co., at South Bethlehem, Pa., is in operation after being idle for several years.

The eight-inch mill at the lower plant of the Oliver Iron & Steel Co., Pittsburg, will soon be started. This plant has been idle for two years.

The Sterling Steel Works, at Demmler, Pa., have completed an order for the United States Government for 400 semi-armor piercing projectiles.

It is decided that the coming convention of the International Molders' Union will be held in Cleveland this year instead of in Chicago.

The Lockhart Iron & Steel Co., has resumed operations with men at its McKees Rocks plant, where a strike took place about six weeks ago.

At Tiffin, O., the court has dissolved the attachments against the Findlay Rolling Mills, levied by the National Bank of Commerce of Cleveland.

At Youngstown, O., 50 boys employed to run nail machines demanded that the nailers pay them the wages of 1893. This was refused and a walk-out followed.

The blast furnace of the Clinton Iron & Steel Co., has been banked on account of a strike by some of the workers who asked for more wages or more help.

The American Steel Casting Co., of Conshohocken, Pa., will resume operations shortly, employing 100 men. The plant has not been in operation for over two years.

For the first time in two years the White Sewing Machine Co., of Cleveland, put all departments of its factory on a 10-hour day, June 3. About 300 men are now employed.

Andrews Bros. Co.'s furnace at Haselton, Youngstown, O., was banked two days last week on account of a strike by metal-carriers. Their places have been taken by other men.

The Keystone Iron Works, at Reading, Pa., long idle, resumed June 10 with 125 hands. The Seyfert Rolling Mills at Seyfert Station, near Reading, idle two years, will soon resume.

At Anderson, Ind., an increase of eight and 12 per cent in the wages of 200 American Wire Nail Works employes was made last week. Those getting $1.25 were advanced to $1.35 and the $1.35 men to $1.50.

The Johnson Railway Signal Works, of Rahway, N. J., were sold under the hammer by Receiver Edward S. Savage, to Oakleigh Thorn, president of the National Signal & Switch Co., of Easton, Pa., for $40,000.

Lancaster, Pa., is embarking in a new industry. As a cure of the tramp evil the authorities have bought a stock of pig iron, and vagrants will be required to carry the pigs from one end of the prison yard to the other.

Henry Warner, receiver of the Linden Steel Co., has petitioned a Pittsburg court for authority to borrow $30,000. He says that he is without cash to put the plate department in operation and there is a great demand for plates.

The bench molders of Cleveland have made a demand for the restoration of wages paid two years ago. This has been refused. Vice President Valentine is on the ground and there is talk of a strike that will involve 1,000 to 1,500 men.

At Muncie, Ind., the Darnell Iron Works resumed with 150 puddlers. The mill is now operated by the Florence Iron & Steel Co. The old White River Iron & Steel Co.'s plant, now owned by the Park Iron & Steel Co., of Cleveland, has also started.

The plans for new blast furnaces at Duquesne, made last year by the Carnegie Steel Co., are now about to be carried out. The tract of land purchased some months ago contains 50 acres. A large expenditure will be involved in the furnaces that are to be erected.

Poulterer & Co., of Philadelphia, have purchased from the Elmira Iron & Steel Rolling Mill Co. its two large blast furnaces at Elmira, N. Y., and will probably remove part of the machinery to the South. They also recently purchased the Rohrerstown Mill, at Rohrerstown, Pa.

P. J. Benbow, one of the receivers of the Otis Steel Co., Cleveland, says the works are busy, especially in the plate mill. Last week a start was made on double turn and 500 men are now employed. It is believed the reorganization will be perfected soon, but nothing definite can be said as yet.

The Sheffield (Ala.) Coal, Iron & Steel Co., capital $750,000, composed of Pennsylvania and Tennessee capitalists, has been organized and has acquired blast furnaces with a capacity of 450 tons a day, 70,000 acres of mineral lands, 300 coke ovens at Jasper, Ala., and the Gumble and Carbon valley coal mines. John Fritz, of Bethlehem, Pa., is president of the corporation.

The Cambria Iron Co. has given notice to its stockholders of an issue of $2,000,000 new stock under the authority given the directors at the meeting of last year. Each stockholder will be allowed to subscribe for the new stock at par at the rate of 40 per cent of his holding. As soon as the new stock is issued the board of directors will declare a dividend of 12½ per cent.

A demand was made by Pittsburg boiler-makers for a 10 per cent advance last week. Several firms responded that the advance could not be made at once and asked time to adjust business to the proposed basis. Riter & Conley proposed to pay the advance after July 8. On Monday night, June 10, the boiler-makers decided to go on a strike, and 1,000 are reported to be out.

At the American Wire Co.'s plant, Cleveland, 200 laborers went on a strike June 7 for $1.37½ a day. They have received $1.25. Their places were filled by others and the strikers gathered about the works, throwing stones and breaking windows. Police were called out. Later the offer of the company to pay an advance of five cents a day was accepted by the old men.

New York capitalists, including Chauncey M. Depew, H. Walter Webb, H. McK. Twombly, John Jacob Astor and Dr. W. Seward Webb have bought a controlling interest at $800,000, in the Depew Improvement Co., which has been building up the town of Depew, N. Y., a suburb of Buffalo. Several new shops for the New York Central are said to be included in the buildings that will be put up. A large sum will be expended in town improvements.

The Illinois Steel Co. sent a delegation of five of its employes to Pittsburg and the two valleys to inquire into the wage basis for blast furnace and steel works labor. The company, in answer to a request from its men for an advance in wages, said that it was already paying as much as other steel companies, even after the increase at the works of the latter. The men have visited Pittsburg, Youngstown, New Castle and Cleveland. In an interview at Youngstown, one of them stated that the claims of their employers had been confirmed, as far as their investigations had gone.

Twenty-five or 30 years ago the Dixon Co., of Jersey City, N. J., even then known as the largest manufacturers of graphite products, began the manufacture and introduction of graphite paint. Ticonderoga flake graphite was used and thoroughly ground in pure, boiled linseed oil. Roofs well painted with this paint did not require repainting for 10 to 15 or even 20 years. In time people recognized the economy and durability of Dixon's graphite paint and demanded that their roofs should be painted with it. This demand has led many painters to make a graphite paint which they claim to be equal

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Successors to D. Fraser Mfg. Co. and Eagle Pattern Wks.

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to Dixon's. Some even offer as graphite paint a compound having the color of graphite, but composed of stove polish, cheap black lead, or even foundry facings, mixed with oil. Other painters, ignorant that there is a vast difference in graphite, have used ordinary commercial black lead, ground with oil, expecting it would meet the requirements of their customers and prove lasting as the genuine Dixon graphite paint. So wide, however, is the difference in results, that experienced buyers insist on seeing the label on the package, or buy the paint themselves and have the painter apply it. Some time ago one of the departments of the U S. Navy ordered 100 lbs. of Dixon's graphite paint of a well known dealer. The dealer, not having that quantity on hand in an original package, filled a keg from a barrel of Dixon's paint and sent it forward. It was promptly returned by the Government officials with the remark, that they had experimented enough with other makes and would only receive original packages. The makers lay stress on the point that when the paint is brushed out each flake laps over its fellows, after the manner of fine fish scales, forming a covering of great elasticity and durability.

Low Rates to Colorado.

On account of the meeting of the National Educational Asscciation at Denver, Col., July 5 to 12, 1895, the North-Western Line will sell excursion tickets to Denver, Pueblo, Colorado Springs and Manitou at a rate not to exceed one fare for the round trip (with $2 added for membership fee). The time limit of these tickets will be extremely liberal, and an excellent opportunity will be afforded for a summer sojourn in the "Rockies," or enjoyable side trips to the Black Hills, Yellowstone National Park or the Pacific Coast. For full information apply to agents of connecting lines, or address W. B. Kniskern, General Passenger and Ticket Agent, Chicago & North-Western Ry., Chicago.; C. Traver, T. P. A., Marine National Bank Building, Pittsburg; F. M. Snavely, T. P. A., 151 St. Clair st., Cleveland, O.

THE Western Society of Engineers will extend the courtesy of one of their rooms in the Monadnock Block to Lehigh University on June 21, 22 and 23, in which to hold its Chicago examinations for admission to the Freshman class. The examinations will be under the direction of Mr. H. F. J. Porter, Western representative of the Bethlehem Iron Co.

THE Nickel Plate Road has published a map of Boston, Mass., showing the location of the Christian Endeavor Convention Hall and State Headquarters of the 14th International Convention, July 10th to 15th, and presenting the merits of their through Drawing Room Sleeping Car line between Chicago and Boston. Write for a copy to any agent of the Nickel Plate Road or B. F. Horner, General Passenger Agent.

THE announcement is made that Youngstown, O., is to have an open-hearth steel plant, to be erected by the Brown-Bonnell Iron Co. east of its present plant, covering the site of the old Falcon furnace. Owing to the amount of land required for the plant, it is proposed to take away a bridge that now cuts through the proposed site and to substitute for it an overhead bridge. The county commissioners have been conferred with about the matter, but no steps have been taken as yet. We are officially advised that the Brown-Bonnell Iron Co. does not contemplate the immediate erection of a steel plant, though the question has been considered.

FOR the conference of the Epworth League at Chattanooga, Tenn., June 27th to 30th, the Nickel Plate Road offers one fare excursion tickets.

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UNION MINING CO.,

Proprietors of the CELEBRATED Mount Savage Fire Brick.

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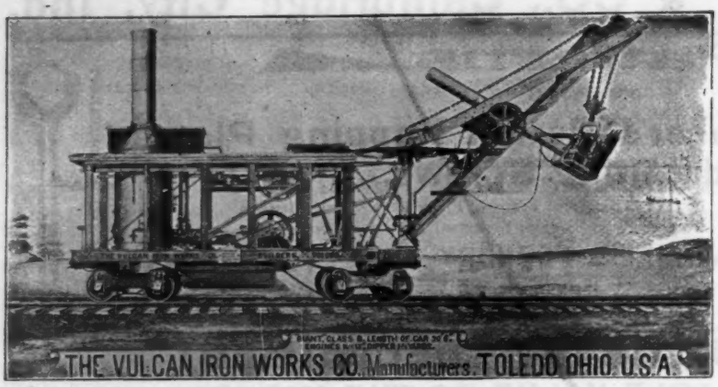

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HIGH GRADE FIRE BRICK for

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REDUCED RATES.

Excursions over Pennsylvania Lines During Season of 1895.

Liberal concessions in fare over the Pennsylvania Lines have been granted for numerous events to take place this summer in various parts of the United States. In addition to local excursions, tickets at reduced rates will be sold over these lines as given in the following paragraphs. Excursion tickets may be obtained at ticket offices on the Pennsylvania system and will also be sold over this route by connecting railways. Some of the points to which tickets will be sold and dates of sale are as follows:

To Cleveland, June 18 and 19, for the National Republican League Convention, good returning until June 22 inclusive.

To Chattanooga, Tenn., June 25, 26 and 27 inclusive, account Epworth League International Conference, good returning 15 days from date of sale. By special arrangement return limit may be extended an additional 15 days.

To Denver, Colorado Springs, Manitou or Pueblo, Col., July 3, 4 and 5, account National Educational Association Meeting. The return trip must be commenced July 12, 13, 14 or 15, unless by special arrangement the return limit is extended to Sept. 1.

To Baltimore, July 16 and 17, good returning until August 5 inclusive, account the Convention of Baptist Young People's Union of America.

To Boston, July 5 to 9 inclusive, for the National Christian Endeavor Meeting. Return limit may be extended by special arrangement to August 3.

To Boston, August 19 to 25 inclusive, account Triennial Conclave Knights Templar. Return limit extended to October 3 by special arrangement.

To Louisville, Ky., in September, for National Encampment, G. A. R. One cent per mile. Reasonable return limit.

The reduced rates over the Pennsylvania Lines will not be restricted to members of the organizations mentioned, but may be taken advantage of by the public generally. Any Pennsylvania Line Ticket or Passenger Agent will furnish desired information concerning rates, time of trains, and other details, to all applicants, or the same may be obtained by addressing F. Van Dusen, Chief Assistant General Passenger Agent, Pittsburg, Pa.

THE Bolt and Nut Manufacturers' Association of the United States met in Cleveland Thursday, June 6, and made a 10 per cent advance in prices. Advances in raw material have reached this industry, but thus far with no compensating increase in the manufactured product. For the most part, the large nut and bolt contracts now being executed were covered by purchases of iron at the low prices of the early months of the year, but as contracts expire new material has called for more money.

THE Nickel Plate Road has compiled a list of country homes along the south shore of Lake Erie, willing to accommodate summer boarders, and a copy will be mailed to any address by enclosing a stamp to any agent of the Nickel Plate Road or to B. F. Horner, Gen'l Passenger Agent.

SUMMER OUTINGS.

At Seashore, Mountain and Lake Resorts.

The Ocean Resorts—Atlantic City, Cape May, Asbury Park, Ocean Grove, Long Branch, and famous resorts along the New Jersey Coast are reached by the Pennsylvania Lines. As a direct route to Newport, Narragansett Pier, Cape Cod, Martha's Vineyard, Nantucket and the popular watering places along the Atlantic from Chesapeake Bay to Maine, these lines offer special advantages.

In the mountains—Cresson, Bedford Springs, Ebensburg, Altoona and other resorts in the Alleghenies are located on the Pennsylvania Lines, which also lead to the White Mountains, the Adirondacks, Watkin's Glen, Mt. Desert Island, and places of summer sojourn in Eastern New York, Vermont, New Hampshire and Maine.

For information concerning rates, time of trains and the first-class service, please apply to nearest Pennsylvania Line Ticket Agent, or address F. Van Dusen, Chief Assistant General Passenger Agent, Pittsburg, Pa.

Summer Tourist Rates

The North-Western Line (Chicago & North-Western Ry.) is now selling excursion tickets at reduced rates to St. Paul, Minneapolis, Duluth, Ashland, Bayfield, Marquette, Deadwood, Dakota, Hot Springs, Denver, Colorado Springs, Manitou, Salt Lake City, and the lake and mountain resorts of the west and northwest. For rates and full information apply to agents of connecting lines. Illustrated pamphlets, giving full particulars, will be mailed free upon application to W. B. Kniskern, G. P. & T. A., Chicago & North-Western Ry., Chicago.

FOR the National Republican League Convention at Cleveland, O., June 18th to 21st, the Nickel Plate Road offers one fare for the round trip.

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Steam Pumps, Boilers, Hoisting Engines, Mine Cars, Trucks, Barrows, Corrugated Roofing, Mill, Mining and Contractors' Supplies.

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For blacksmith shop doing car work and general forging. Must be a thoroughly practical man; able to handle men to advantage, and must be capable of designing dies and formers for drop hammers and other machines. Only first-class men need apply. Address

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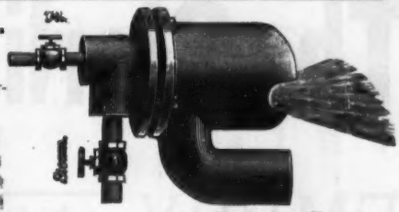

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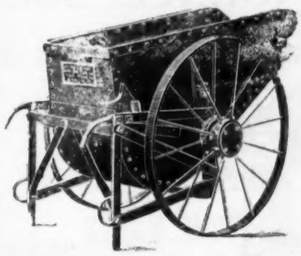

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Safety, Economic

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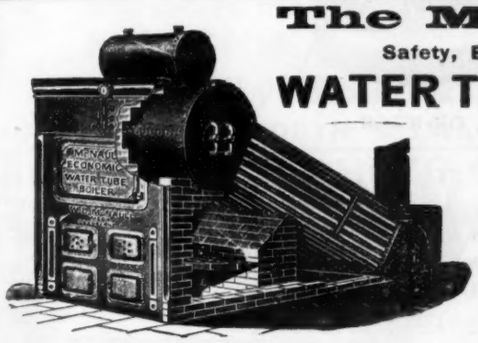

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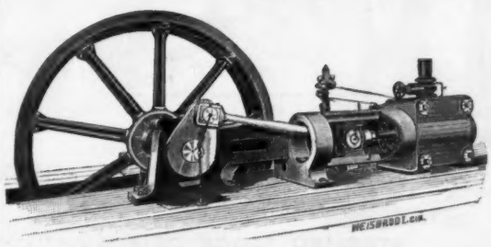

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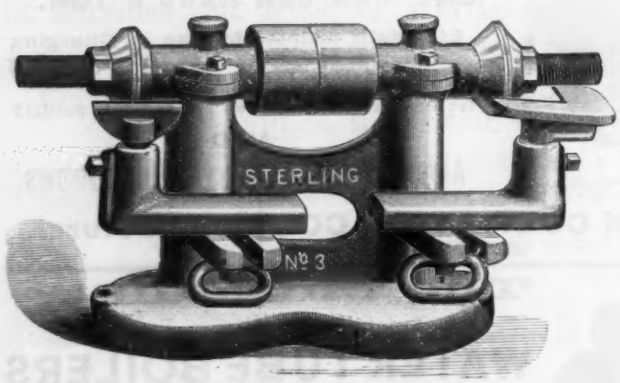

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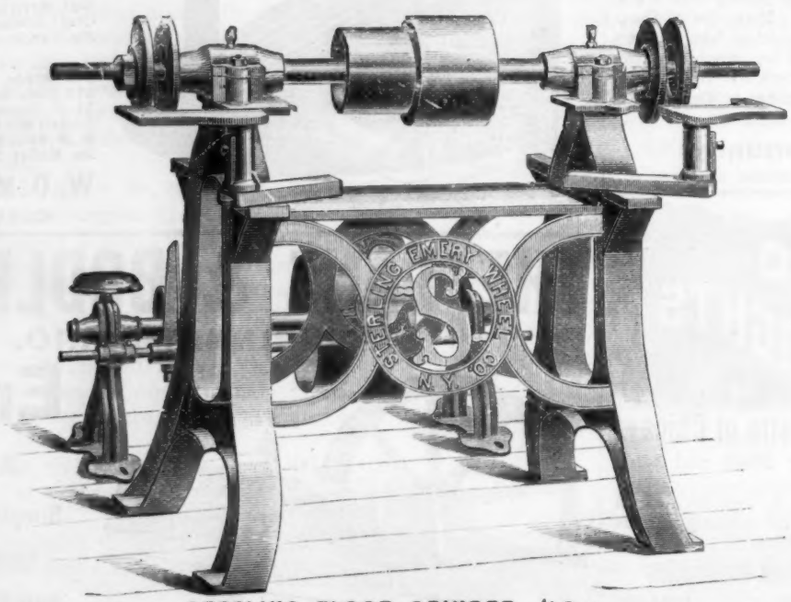
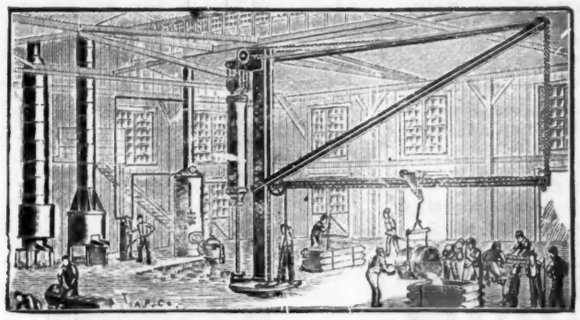


STERLING FLOOR GRINDER, "C."

"Do You Smell a Rat?"



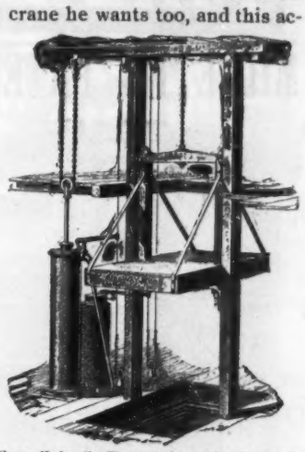
5-ton Steam-Hydraulic Crane in a Foundry.

We thought maybe you might when you saw the bes Foundries and Mills and Iron and Steel Plants all over the country putting in the Ridgway Balanced Steam Hydraulic Cranes as rapidly as they are. If you are a keen, wide-awake man you might ask yourself, why? People don't buy cranes for their health or for the fun of the thing. Why does a Foundry put in one of these cranes and then like our old friend Oliver Twist, cry for "more." We'll tell you. Because when a Foundryman gets a crane going he is amazed to find

That the same molders turn out 50 per cent more work with the same wages than with any other crane and does it easier and better.

And that's all there is about it. Of course any man who knows anything at all about cranes, knows that a crane which will meet the exacting requirements of a foundry with its dirt and dust and hard usage is just the kind of a crane he wants too, and this accounts for the Pipe Mills, Wire Works, Steel Mills and other places reaching for them so eagerly.

In short, the Ridgway Crane is a Money-maker from the word "Go", and this tells the whole story and why we are selling more power swing cranes than all other makers put together.



Steam-Hydraulic Elevator, also made direct-acting with cylinder under platform.

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and save your self lots of money and bother. It is the best thing for the purpose now made.

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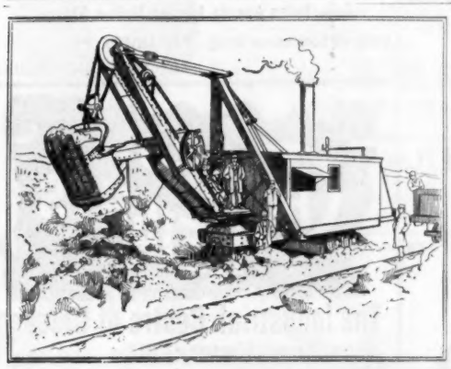
CRAIG RIDGWAY & SON, Coatesville, Pa.



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STEAM SHOVELS	Five sizes for every purpose. Standard Railroad Shovels. Special Shovels to order.
DREDGING MACHINES	More than 20 sizes in all types. Dipper, Elevator, Hydraulic, to suit any requirements.
GOLD SAVING MACHINERY	For Placer Mining. With steam shovels and appliances for disposal of tailings.
WRECKING CRANES	Hand or Steam, 5 to 35 tons capacity. Also Locomotive Cranes and Pile-Drivers.
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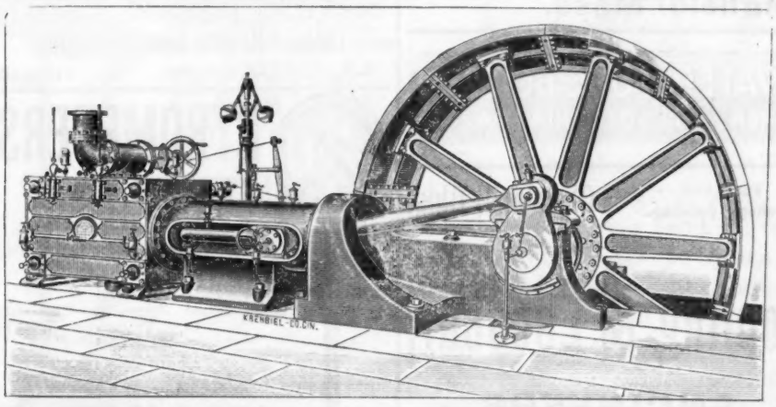

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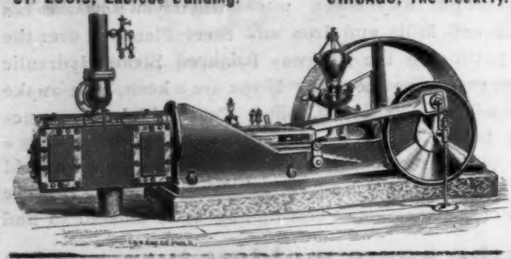

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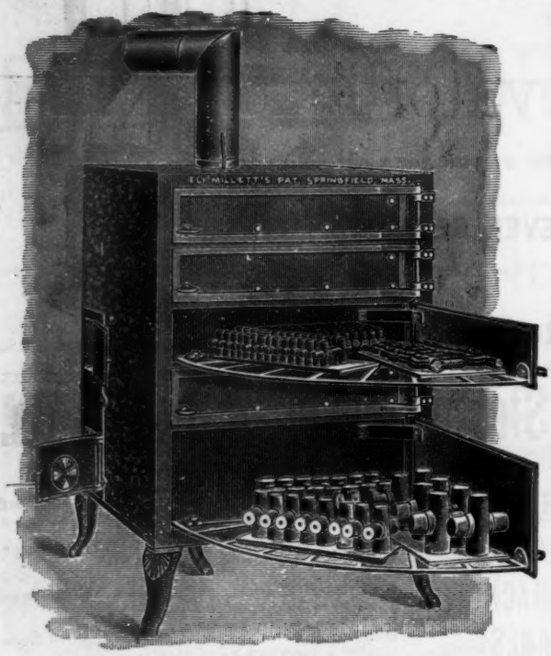

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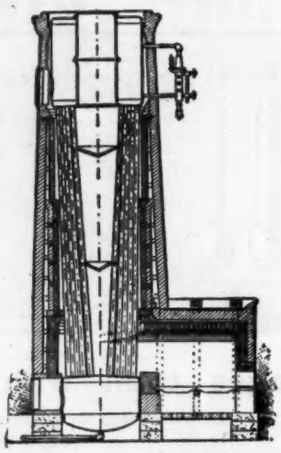

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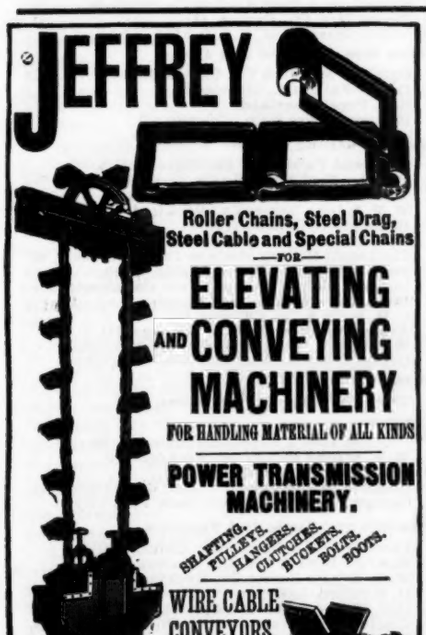

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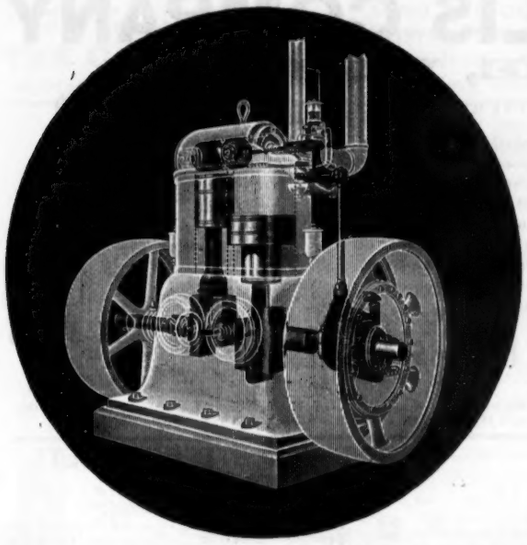

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W. A. Crook & Bro's Co., Newark, N. J.
The Edward P. Allis Co., Milwaukee, Wis.
American Hoist & Derrick Co., St. Paul, Minn.
Willis Shaw, 416 N. Y. Life Bldg., Chicago.

Moulding Sand—
Ohio Sand Co., Conneaut, O.
Milwaukee Fdy. Supply Co., Milwaukee, Wis.

Nickel—
Canadian Copper Co., Cleveland, O.

Oil Cups—
Ed. Wertheim, Chicago.
C. H. Besly & Co., Chicago, Ill.
The Pittsburg Gauge Co., Pittsburg, Pa.

Oil Pumps—
Ed. Wertheim, Chicago.
C. H. Besly & Co., Chicago, Ill.
The Pittsburg Gauge Co., Pittsburg, Pa.

Ore Crushers—
The Edward P. Allis Co., Milwaukee, Wis.
American Hoist & Derrick Co., St. Paul, Minn.

Packing—
Ed. Wertheim, Chicago.
C. H. Besly & Co., Chicago, Ill.
The Pittsburg Gauge Co., Pittsburg, Pa.

Paint—
Iron Clad Paint Co., Cleveland.
Jos. Dixon Crucible Co., Jersey City, N. J.
Empire Paint & Roofing Co, Philadelphia, Pa.
Detroit Graphite Mfg. Co., Detroit, Mich.

Pattern Makers—
Milwaukee Fdy. Supply Co., Milwaukee, Wis.

Perforated Sheet Metal—
Harrington & King Perforating Co., Chicago, Ill
Aitchison Perforated Metal Co., Chicago.
Hendrick Mfg. Co. Ltd., Carbondale, Pa

Pipe Covering—
Ed. Wertheim, Chicago.
C. H. Besly & Co., Chicago, Ill.

Planers—
Prentiss Tool & Supply Co., Chicago, Ill.
Hill, Clarke & Co., Chicago, Ill.
Lodge & Shipley Machine Tool Co., Cincinnati.
George Place Machine Co., New York City.

Plumbers' and Gas Fitters' Supplies—
Ed. Wertheim, Chicago.
C. H. Besly & Co., Chicago, Ill.
The Pittsburg Gauge Co., Pittsburg, Pa.

Portable Core Ovens—
Millett Core Oven Co., Brightwood, Mass.

Portable Forges—
Buffalo Forge Co., Buffalo, N. Y.
Cady Mfg. Co., Cleveland, O.
C. H. Besly & Co., Chicago, Ill.
B. F. Sturtevant Co., Boston, Mass.

Presses—
Toledo Machine & Tool Co., Toledo, O.
Cady Mfg. Co., Cleveland, O.
Bertsch & Co., Cambridge City, Ind.
Fox Machine Co., Grand Rapids, Mich.
C. H. Besly & Co., Chicago, Ill.

Pulleys—
W. A. Jones Foundry Co., Chicago, Ill.

Pulley Blocks—
Moore Mfg. & Foundry Co., Milwaukee, Wis.
American Hoist & Derrick Co., St. Paul, Minn.
Willis Shaw, 416 N. Y. Life Bldg., Chicago.

Pumps—
Ed. Wertheim, Chicago.
Deming Co., Salem, O.
The Edward P. Allis Co., Milwaukee, Wis.
The Pittsburg Gauge Co., Pittsburg, Pa.
Willis Shaw, 416 N. Y. Life Bldg., Chicago.

Pumps (Steam)—
Brightman Stoker Co., Cleveland, O.
Ed. Wertheim, Chicago.
The Pittsburg Gauge Co., Pittsburg, Pa.

Pyrometers—
Edward Brown, Philadelphia, Pa.

Railway Supplies—
Cleveland City Forge & Iron Co., Cleveland.
Ed. Wertheim, Chicago.

Rock Breakers—
American Hoist & Derrick Co., St. Paul, Minn.

Rolling Mill Machinery—
The Lloyd-Booth Co., Youngstown, O.
Totten & Hogg I. & S. F'dry Co., Pittsburg, Pa.

Roofing (felt)—
Consolidated Roofing Works, Columbus, O.
Empire Paint & Roofing Co., Philadelphia, Pa.

Sand and Chill Rolls—
The Lloyd-Booth Co., Youngstown, O.

Saws—
Peter Gerlach & Co., Cleveland.

Schools—
Michigan Mining School, Houghton, Mich.

Screens for Coal Ore, Etc.
Robt. Aitchison Perforated Metal Co., Chicago.
Harrington & King Perforating Co., Chicago.
Hendrick Mfg. Co., Ltd., Carbondale, Pa.

Scrap Iron & Steel—
Klein & Cohn, Cincinnati, O.

Screws—
Illinois Screw Co., Chicago, Ill.
C. H. Besly & Co., Chicago, Ill.

Second-Hand Machinery—
Prentiss Tool & Supply Co., Chicago, Ill.
Hill, Clarke & Co., Chicago, Ill.
George Place Machine Co., New York City.

Shearing and Punching Machinery—
Bertsch & Co., Cambridge City, Ind.
Toledo Machine & Tool Co., Toledo, O.
Cady Mfg. Co., Cleveland, O.
Fox Machine Co., Grand Rapids, Mich.
Long & Allstatter Co., Hamilton, O.

Sheet Iron—
Cleveland Rolling Mill Co., Cleveland.
Berger Bros., Philadelphia, Pa.

Special Machinery—
Toledo Machine & Tool Co., Toledo, O.
Cady Mfg. Co., Cleveland, O.
Bertsch & Co., Cambridge City, Ind.
Fox Machine Co., Grand Rapids, Mich.
Lodge & Shipley Machine Tool Co., Cincinnati.

Split Collars—
Gouverneur Machine Co., Gouverneur, N. Y.

Stamping and Punching—
Cady Mfg. Co., Cleveland, O.

Steam Boiler Inspectors—
Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.

Steam Pipe and Boiler Covering—
Keasbey & Mattison Co., Ambler, Pa.
Ed. Wertheim, Chicago.
C. H. Besly & Co., Chicago Ill

Steam Packing—
Ed. Wertheim, Chicago.
C. H. Besly & Co., Chicago, Ill.
The Pittsburg Gauge Co., Pittsburg, Pa.

Steam Shovels and Dredges—
Bucyrus Steam Shovel & Dredge Co., Bucyrus, O.
Vulcan Iron Works Co., Toledo, O.

Steam Specialties—
Ed. Wertheim, Chicago.
C. H. Besly & Co., Chicago, Ill.
Pittsburg Gauge Co., Pittsburg, Pa.

Steel—
Wm. Jessop & Sons, Ltd., New York, N. Y.

Steel Castings—
Wm. Jessop & Sons, Ltd., New York, N. Y.

Steel Rails, Blooms and Billets—
Cleveland Rolling Mill Co., Cleveland.
Bethlehem Iron Co., South Bethlehem, Pa.

Steel Stamps and Stencils—
J. H. Fleharty & Co., Cleveland.

Turnbuckles—
Cleveland City Forge & Iron Co., Cleveland.

Tanks—
S. Freeman & Sons Mfg. Co., Racine, Wis.
Enterprise Boiler Co., Youngstown, O.

Telephones—
Union Electric Co., Cleveland, O.

Tinning Machinery—
The Lloyd-Booth Co., Youngstown, O.

Tin Plate—
Gummey, Spering & Co., Philadelphia, Pa.

Tool Steel—
Wm. Jessop & Sons, Ltd., New York, N. Y.
C. H. Besly & Co., Chicago, Ill.

Tube Welding—
S. Fix Sons, Cleveland.

Twist Drills—
Cleveland Twist Drill Co., Cleveland.
Manufacturers' Tool Supply Co., Chicago.
C. H. Besly & Co., Chicago, Ill.
Machinists' Supply Co., Chicago.

Valves—
Ed. Wertheim, Chicago.
C. H. Besly & Co., Chicago, Ill.
The Pittsburg Gauge Co., Pittsburg, Pa.

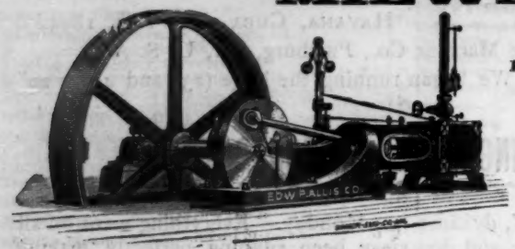
Wheel Barrows—
Akron Cultivator Co., Akron, O.

Wire Rope—
W. A. Crook & Bro's Co., Newark, N. J.
C. W. Hunt Co., New York City.
George Cradock & Co., Chicago, Ill.
American Hoist & Derrick Co., St. Paul, Minn.

Wire Machinery—
Cady Mfg. Co., Cleveland, O.

CLEVELAND ELECTROTYPE CO.
ELECTROTYPING & ENGRAVING
50 HIGH ST. TEL. 2139

THE EDWARD P. ALLIS COMPANY
MILWAUKEE, WIS.



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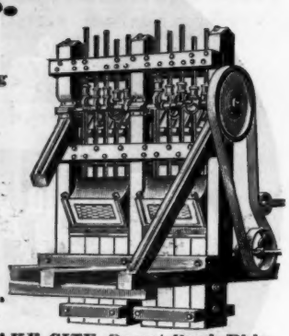
Blowing Engines, Hoisting Engines, Pumping Engines, Air Compressors, Special Engines for Electric Lighting, Street Railways and Rolling Mills, Ore Crushers, Crushing Rolls, Stamp Mills, Concentrators, General Mining, Milling and Smelting Machinery.



REYNOLDS PATENT VERTICAL BOILERS. REYNOLDS CORLISS ENGINES.

NEW YORK, Room 1111, Havemeyer Bldg.
CHICAGO, Room 509, Home Ins. Bldg.
MINNEAPOLIS, Room 416, Corn Exchange.
DENVER, 1316 18th Street.
SAN FRANCISCO, 31 Main Street.
PITTSBURG, 703 German Nat'l Bank Bldg.
SALT LAKE CITY, Desert Bank Bldg.
KANSAS CITY, Armour Bldg.

Alphabetical List of Advertisers.

The star (*) indicates that the adv. appears alternate weeks; the dagger (†) once a month; the double dagger (‡) once in three weeks; the parallel (‖) three times out of four.

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$2.50 CLEVELAND TO BUFFALO

Via "C. & B. LINE,"

Commencing with opening of navigation (about April 1st). Magnificent side-wheel steel steamers

"State of Ohio" and "State of New York."

DAILY TIME TABLE.

SUNDAY INCLUDED.

Lv. Cleveland, 6:00 P.M. | Lv. Buffalo, 6:30 P.M.
Ar. Buffalo, 7:30 A.M. | Ar. Cleveland, 7:30 A.M.

CENTRAL STANDARD TIME.

Take the "C. & B. Line" steamers and enjoy a refreshing night's rest when enroute to **Buffalo, Niagara Falls, Toronto, New York, Boston, Albany, 1,000 Islands,** or any Eastern or Canadian point.

Cheap Excursions Weekly to Niagara Falls.

Send 4 cents postage for tourist pamphlet.

W. F. HERMAN, Gen'l Pass. Agt. T. F. NEWMAN, Gen'l Manager.
Cleveland, O.

JOHN FRASER,

MECHANICAL ENGINEER and DESIGNER of
STEAM AND HYDRAULIC MACHINERY.
DESIGNING FOR
Steel Works, Rolling Mills and Blast Furnaces
A SPECIALTY.
1436 Monadnock, - - CHICAGO.

If you are thinking of enlarging your mill, foundry or machine shop, or of purchasing machinery of any kind, send us a line giving character of machinery needed. We can put you in communication with manufacturers from whom you can buy advantageously.

IRON AND STEEL MARKETS.

IRON ORE.

[On Lake Erie docks.]

No. 1 Specular, Bessemer	3.05@ 3.40
No. 1 Bessemer hematite	2.90@ 3.00
Hematites No. 1 non-Bessemer	2.00@ 2.25
No 1. Specular, non-Bessemer	2.35@ 2.75

PIG IRON.

CLEVELAND (f. o. b. cars):	
Bessemer	$11 75@$11 90
No. 1 Strong Foundry	11 25@ 11 50
No. 2 Strong Foundry	10 00@ 10 50
No. 1 Gray Forge, red short	10 15@ 10 40
No. 2 Gray Forge, neutral	10 00@ 10 25
No. 1 American Scotch	00 00@ 11 65
No. 2 American Scotch	10 50@ 10 75
Lake Superior Charcoal	13 00@ 13 50
PITTSBURG:	
No. 1 Foundry	$11 00@$11 25
No. 2 Foundry	10 25@ 10 50
Gray Forge	10 00@ 10 25
White and Mottled	9 50@ 9 75
Warm Blast Charcoal	16 00@ 17 00
Cold Blast Charcoal	22 00@ 26 00
Bessemer	11 60@ 11 75
CHICAGO (reported by our representative:)	
Lake Superior Charcoal	$13 00@$13 50
Local Coke Foundry No. 1	11 25@ 11 50
Local Coke Foundry No. 2	10 75@ 11 00
Local Coke Foundry No. 3	10 50@ 10 75
Local Scotch Foundry No. 1	11 25@ 11 50
Local Scotch Foundry No. 2	10 75@ 11 00
Local Scotch Foundry No. 3	10 50@ 10 75
Southern Coke No. 1	10 75@ 11 00
Southern Coke No. 2	11 00@ 11 25
Southern Coke No. 3	10 75@ 11 00
Southern No. 1 Soft	11 00@ 11 25
Southern No. 2 Soft	10 75@ 10 00
Southern Silveries No. 1	11 75@ 12 00
Southern Silveries No. 2	11 25@ 11 50
Jackson Co. Silveries	15 00@ 16 00
Ohio Silveries No. 1	14 00@ 14 50
Ohio Silveries No. 2	13 00@ 13 50
Ohio Strong Softeners	13 00@ 13 50
Alabama Car Wheel	16 50@ 17 00
Malleable Bessemer	11 75@ 12 00
Coke Bessemer	12 00@ 12 50
CINCINNATI (reported by Rogers, Brown & Co.)	
Southern Coke No. 1, Foundry	$10 50@$10 75
Southern Coke No. 2 and No. 1 Soft	10 00@ 10 25
Hanging Rock Coke, No 1	11 50@ 12 75
Hanging Rock Charcoal No. 1, Fdy	15 00@ 16 50
Tennessee Charcoal No 1	13 00@ 14 50
Jackson County Stone Coal No 1	14 00@ 14 50
Southern Coke, Gray Forge	9 50@ 10 00
" " Mottled	9 50@ 10 00
Standard Alabama Car Wheel	15 00@ 16 00
Tennessee " "	14 50@ 15 00
Lake Superior " "	13 50@ 14 00

OLD RAILS AND SCRAP METAL.

[Prices paid by mills.]

	Gross Tons
Old iron rails	$12 50
Old steel rails	10 00
	Net Tons
No. 1 R. R. wrought scrap	$10 00
No. 1 wrought scrap	9 50
No. 1 Machine cast scrap	8 50
Iron axles	15 00
Axle turnings	8 00
Wrought turnings (free from cast)	7 00
Cast borings	5 50
Uncut wrought iron boilers	4 00
Steel boiler plates	8 00
Grate bars	5 50
Pipes and flues (clean)	7 50
Tank iron	7 50
Hoop and band iron	6 00
Sheet iron	6 00
Wrought drillings	7 00
Malleable iron	8 00

STRUCTURAL MATERIAL.

Beams and Channels (Cleveland mill)	1.30c@1.35c
Angles	1.20c@1.25c
Tees	1.35c@1.45c
Universal Plates	1.20c
Sheared Plates	1.30c

MERCHANT IRON AND STEEL.

[List prices out of store.]

Flat Bar.

1¼ to 4 by ⅜ to 1 inch	1 10
4¼ to 6 by ⅜ to 1 inch	1 15
1¼ to 6 by 1¼ to 2 inch	1 30
1¼ & 1¾ by ⅜ to ¾ inch	1 15
1 & 1¼ by ¾ to ¾ inch	1 20
⅛, ¼, ⅜, by ¾ to ⅜ inch	1 30

Frank P. Cady, Pres. and Supt.
Geo. H. Bowler, Sec'y and Treas.
THE CADY MFG. CO.
18, 20 and 22 Johnson St., CLEVELAND, O.

SEND FOR OUR NEW CATALOGUE OF Power Presses, Drop Hammers, Punches and Shears, Wire Working and Special Machinery.

PERFORATED METALS
OF ALL KINDS FOR
MILLING MINING AND AGRICULTURAL MACHINERY,
PERFORATED IRON, STEEL, COPPER, BRASS, TIN, ZINC, LEAD, ETC., TO ORDER.
LARGE AND VARIED ASSORTMENT OF SIZES. CORRESPONDENCE SOLICITED.
THE ROBERT AITCHISON. PERFORATED METAL CO.,
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THE
LONG & ALLSTATTER CO.
HAMILTON, OHIO, U. S. A.
Manufacturers of Belt, Steam and Electrically driven
POWER PUNCHES AND SHEARS,
for all kinds of Boiler, Tank and Structural Iron Work, Rolling Mills, Locomotive Shops, Car and Wagon Shops, Plow Shops, etc.
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WESTMORELAND FIRE BRICK CO.
MANUFACTURERS OF HIGH GRADE FIRE BRICKS.
PITTSBURG, PA.
Workstand Mines, Westmoreland, Pa.

PL DIXON'S PERFECT LUBRICATING GRAPHITE.
The most Marvelous Lubricant Known.
Used Dry, or Mixed with Water, Oil or Grease
NOT AFFECTED BY HEAT, COLD, STEAM OR ACIDS.
An Interesting and Instructive Pamphlet will be sent Free of Charge.
JOS. DIXON CRUCIBLE CO. Jersey City, N. J.

IRON CLAD PAINT CO.
Factory, 75 & 77 Central Way. Sec. & Treas., No. 3 Case Build'g.
CLEVELAND, OHIO.

ORDER DIRECT FROM THE
Iron Clad Paint Co.
And get the genuine article, and save liability of suit for using an article made in violation of the patents issued to Wm. Green, and now owned by this Company.
IRON CLAD PAINT is the most durable, most fire-proof and Cheapest Paint made.
FURNISHED both Dry and Ground in Oil
USED BY NEARLY ALL THE RAILROADS.

Subscribe for The Iron Trade Review, $3 per year.

Round and Square.

1 to 1⅞ inch	1 10
2 to 2¾ inch	1 30
2¾ to 3¼ inch	1 25
3⅜ to 4 inch	1 60
4¼ to 4½ inch	2 30
4¾ to 5 inch	2 40

Oval.

⅜ to 1¼ inch	1 30
⅜ to ¾ inch	1 30
½	1 50
⅝	1 70

Half Oval and Half Round.

1⅛ to 3 inch	1 60
⅜ to 1⅛ inch	1 45
⅜ to ¾ inch	1 70
½	1 85
⅝	2 90

Heavy Band.

1¼ to 6 by ¼ and 5-16 inch	1 20
1 to 1⅜ by ¼ and 5-16 inch	1 25
⅜ to ⅝ by ¼ and 5-16 inch	1 35
½ to ⅝ by ¼ and 5-16 inch	1 60

Hoop Iron.

1 7-16 to 4, No. 13, 14, 15 and 16	1 65
1 7-16 to 2, No. 17, 18 and 19	1 70
1 7 16 to 2, No. 20	1 80
1 7-16 to 2, No. 21	1 90
1 7 16 to 2, No. 22	2 00
1⅛ to 1⅜, No. 13, 14 and 15	1 70
1⅛ to 1⅜, No. 16, 17 and 18	1 75
1⅛ to 1⅜, No 19 and 20	1 80
1⅛ to 1⅜, No. 21	1 90
1⅛ to 1⅜, No. 22	2 00
15-16 and 1 inch, No. 13, 14 and 15	1 65
15-16 and 1 inch, No. 16, 17 and 18	1 80
15-16 and 1 inch, No. 19 and 20	1 90
15-16 and 1 inch, No. 21	2 00
15-16 and 1 inch, No. 22	2 10
⅞, No. 13, 14 and 15	1 90
⅞, No. 16, 17 and 18	2 00
⅞, No. 19 and 20	2 10
⅞, No. 21	2 20
⅞, No. 22	2 30
13-16, No. 13, 14 and 15	2 00
13-16, No. 16, 17 and 18	2 10
13-16, No. 19 and 20	2 20
13-16 No. 21	2 30
13-16, No. 22	2 40
¾, No. 13, 14 and 15	2 10
¾, No. 16, 17 and 18	2 25
¾, No. 19 and 20	2 35
¾, No. 21	2 45
¾, No. 22	2 55
11-16, No. 13, 14 and 15	2 35
11-16, No. 16, 17 and 18	2 40
11-16, No. 19 and 20	2 50
11-16, No. 21	2 60
11-16, No. 22	2 70
11-16, No. 23	2 80
⅝, No. 13, 14 and 15	2 40
⅝, No. 16, 17 and 18	2 50
⅝, No. 19 and 20	2 60
⅝, No. 21	2 70
⅝, No. 22	2 80
⅝, No. 23	2 90
9-16, No. 13, 14 and 15	2 60
9-16, No. 16, 17 and 18	2 70
9-16, No. and 20	2 80
9-16, No. 21	2 90
9-16, No. 22	3 00
9-16, No. 23	3 10
7-16 and ½ inch, No. 13, 14 and 15	2 80
7-16 and ½ inch, No. 16, 17 and 18	2 90
7-16 and ½ inch, No. 19 and 20	3 00
7-16 and ½ inch, No. 21	3 10
7-16 and ½ inch, No. 22	3 20
7-16 and ½ inch, No. 23	3 30
⅜, No. 13, 14 and 15	3 30
⅜, No. 16, 17 and 18	3 40
⅜, No. 19 and 20	3 50
⅜, No. 21	4 00
⅜, No. 22	3 90
⅜, No. 23	4 05

Light Band.

1⅛ to 6 by ⅛ to 3-16 inch	1 40
1¼ to 6 by Nos. 11 and 12	1 45
1 to 1¾ by ⅛ to 3-16 inch	1 45
1 to 1¾ by Nos. 11 and 12	1 50
⅞ and 13-16 by ⅛ to 3-16 inch	1 60
⅞ and 13-16 by Nos. 11 and 12	1 65
¾ and 11-16 by ⅛ to 3-16 inch	1 70
¾ and 11-16 by Nos. 11 and 12	1 75
⅝ and 9-16 by ⅛ to 3-16 inch	1 85
⅝ and 9-16 by Nos. 11 and 12	1 90
½ by ⅛ to 3-16 inch	2 00
½ by Nos. 11 and 12	2 05

Wagon Box Iron.

⅜ inch, beveled edge, by Nos. 11 and 12	1 60
⅞ inch, " " " " 13 and 14	1 70
¾ inch, " " " " 11 and 12	1 75
¾ inch, " " " " 13 and 14	1 05

Sheet Iron.

No. 10	1 65
No. 12	1 75
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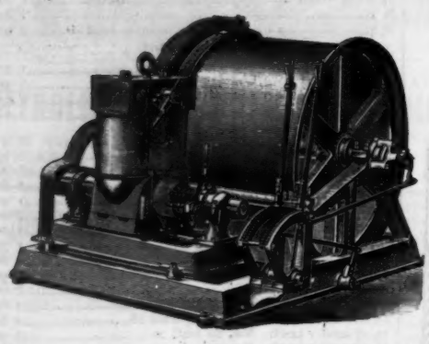

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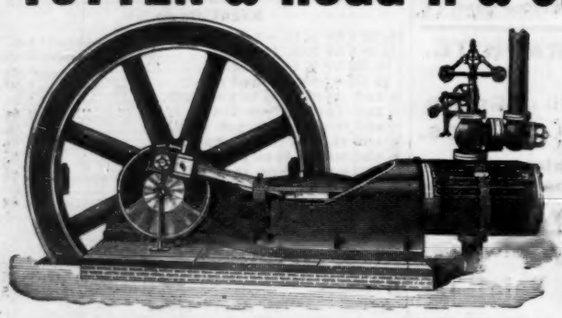

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Pittsburgh, Bellaire and East	†12:45 pm	† 6:25 pm
Philadelphia and New York	* 1:40 pm	*11:25 am
Baltimore and Washington	* 1:40 pm	*11:25 am
Alliance and Pittsburgh	* 1:40 pm	*11:25 am
Ravenna and Alliance	† 1:25 pm	† 9:50 am
Hudson and Ravenna	* 5:00 pm	* 8:25 am
Philadelphia and New York	*11:10 pm	* 5:25 am
Baltimore and Washington	*11:10 pm	* 5:25 am
Alliance and Pittsburgh	*11:10 pm	* 5:25 am

Mt. Vernon and Pan-Handle Route

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Akron, Canton & Chicago	*8:00 A M	*6:30 P M
Wooster and Chicago	†2:45 P M	†11:00 A M
Wooster		†6:30 P M
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P. S. W	dis 40
Atha new list, Jan. 15, 1887	dis 50
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" " " " over 5 lbs	10c

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Illinois Bolt Co. list	dis 75

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Size of bolt inches	¼	5-16	⅜	½	⅝	¾	1
Square	8	7	5½	4¼	4	3½	3¼
Hexagon	15½	11¼	8¼	6	5¼	5¼	
Washers	9	8	7	5	4½	4½	4½

In lots less than 100 lbs, ¼ lb add ½c., 1 lb boxes add 1c to list.

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List July 14, 1887	dis 85
Standard Penny Nails, ¼ keg card rate	
Car lots	$1.05
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Brass and Copper	dis 50
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Medart Pulleys	dis 50
Split Wood Pulleys	dis 55@60

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Rivets.

Iron, Thousand, list November 1, 1894	dis 60@5
Iron, Ordinary, Cooper's Block and Carriage list November 1, 1894	dis 60@65
Copper	dis 50@50&10

Taps.

Cards, Hand and Nut to 2 in	dis 50
Carpenters' " " "	dis 50
Morse " " "	dis 50
Pratt & Whitney " " new list	dis 10
Machine Screw Taps	dis 55
Pipe Taps to 2½ in	dis 70
Stay Bolt Taps	dis 25
Stove Bolt Taps	dis 55
Pulley Taps	dis 40

Vises.

Solid Box	dis 60
Parker's	dis 20@25
Prentiss	dis 20
Stephen's	dis 25@30
Barrett's	dis 30
Miller's Falls	dis 40
Merrill's	dis 15@20
Howard	dis 35

Wire.

	New List, Apr. 9, 1894
Brass	dis 40
Copper	dis 40
Bright and annealed, Nos. 0@18	dis 70&10@75
" " Nos. 19@26	dis 75@75& 5
" " Nos. 27@36	dis 75&10& 5
Coppered Nos. 0 to 18, market list	dis 70@70& 5
Galvanized Nos. 0 to 18 " "	dis65&
Tinned market Nos. 0 to 18	dis 67½
Cast steel	dis 50
Tinned Broom Wire	dis 70&5@70&10
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Annealed Grape, Nos. 10 to 14	dis 75
Stub's Steel Wire regular	95c ¼ lb dis 30

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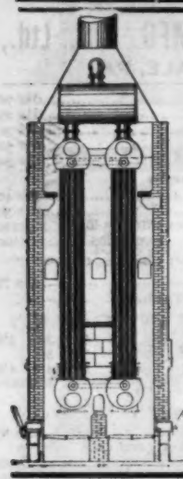

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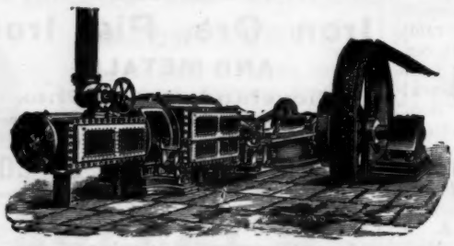

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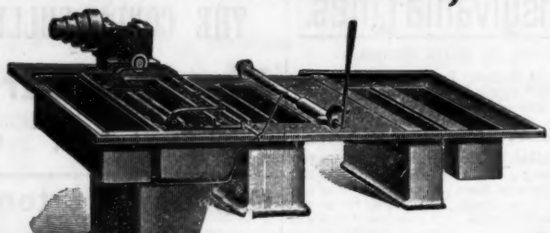

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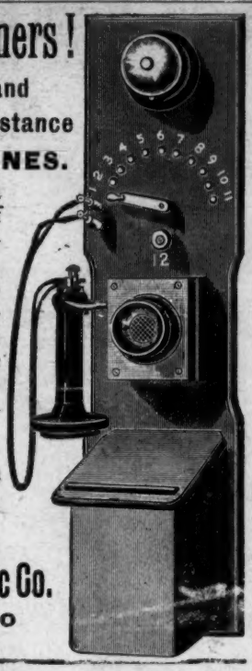

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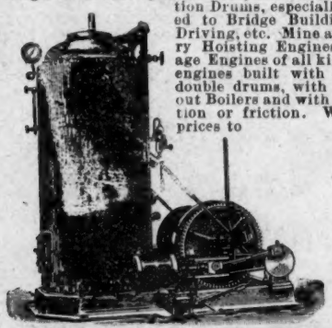

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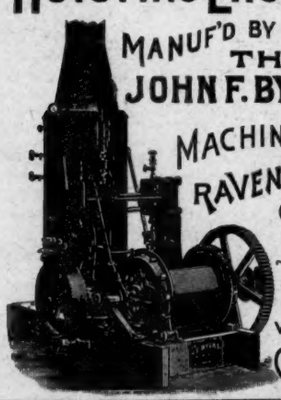

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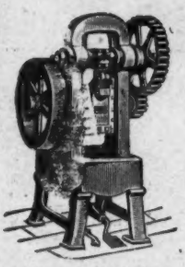

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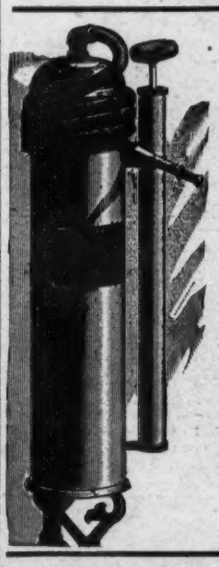

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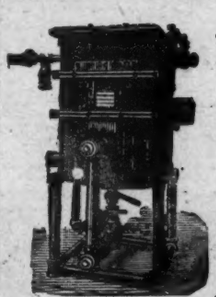

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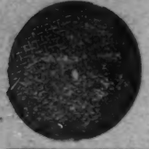

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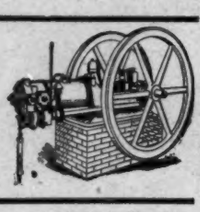

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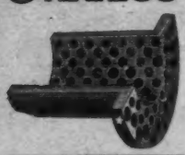

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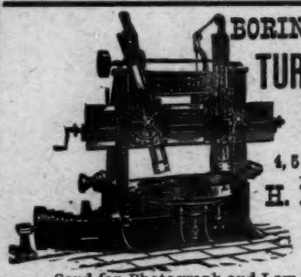

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